Canada–B.C.
Conservation and Renewable Energy Demonstrations

Energy, Mines and Resources Canada
Conservation and Renewable Energy Branch

Energie, Mines et Ressources Canada
Bureau de la conservation et des énergies renouvelable

Province of British Columbia

Ministry of Energy, Mines and Petroleum Resources
CONSERVATION AND TECHNOLOGY DIVISION

A STUDY OF DISTRICT HEATING FOR TUMBLER RIDGE, B.C.

Sponsored by

District of Tumbler Ridge

B.C. Ministry of Energy, Mines and Petroleum Resources

Energy, Mines and Resources Canada

1982

CANADA/BRITISH COLUMBIA CONSERVATION AND RENEWABLE ENERGY DEMONSTRATION AGREEMENT

The availability of secure and affordable energy supplies is a subject of national concern. It is an accepted fact that our primary energy sources - oil and natural gas - are becoming less accessible and more costly. However, Canada is well-endowed with non-renewable and alternative resources that can provide a bridge into the future.

To this end, the government of British Columbia and Canada have entered into a Conservation and Renewable Energy Demonstration Agreement. The Agreement is dedicated to the development and demonstration of conservation and renewable technologies.

The objectives of CREDA are:

- To develop and demonstrate promising new technologies, which, when widely adopted, will exploit renewable resources, conserve energy and/or use energy more efficiently.
- To develop broad public awareness of the potential of renewable energy and conservation technology.
- To provide opportunities for the commercial application of the technologies within B.C.
- To create economic spin-off benefits for manufacturing, industry and commerce.
- To create employment in new or existing energy-related industries.

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ACKNOWLEDGEMENT AND DISCLAIMER

Much of the Information in this document has been taken from two reports by Intercontinental Engineering Ltd. (INTEG) entitled:

- The District of Tumbler Ridge District Heating System: Review of Costs and Feasibility (March 1982)
- District of Tumbler Ridge District Heating System Feasiblity Study: Supplementary Report (May 1982)

As a consequence, the contents of this report reflect the views of the contractor, Intercontinental Engineering Ltd., (INTEG), and not necessarily the official views of the District of Tumbler Ridge, B. C. Ministry of Energy, Mines and Petroleum Resources and Energy, Mines and Resources Canada.

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

District heating is simple in concept. The main components are a central source of heat, a network of pipes through a building district for the transportation of hot water or steam, and a means of heat exchange in individual houses, apartment blocks or commercial buildings.

Tumbler Ridge, the townsite for the northeastern B.C. coal development is presently being built. For the introduction of district heating, this makes it a "greenfield" site, with construction and other conditions being favourable, for example:

1. Pipes for the distribution system can be laid when streets are excavated for the installation of other utilities;

2. Location of the heating plant can be centred to reduce pipe cost;

3. New dwelling units being built can be designed to accommodate the use of hot water as energy for heating;

4. Fuel (coal) for the system is inexpensive, local and plentiful.

It is the absence of these very conditions which drive up the costs of installing a new system in an existing town.

This study evaluates the feasibility of a district heating system, using coal as fuel, for the District of Tumbler Ridge. The features and benefits of district heating, and the purpose as well as methods of study are outlined in Chapter 1.

The feasibility of the scheme is given from the viewpoint of the town, i.e., the costs and benefits experienced by the town and excluding those attributable to the consumer. The net present worth (or price at which energy would be sold) required a margin as an incentive to the consumer to use the district heating system in preference to a conventional alternative form of heating.

System Design

The heating plant design described in Chapter 3 is based on proven thermal power engineering principles with suitable plant redundancy to meet upset and partial load conditions. Four boilers, one oil fired and three coal fired are included and sized to match the heating demand of the town. The pipeline distribution system follows standard Scandanavian practice using loops to ensure minimal disruption of supply. Scandanavian countries have over 60 years of experience with district heating.

Capital Costs

Capital costs (Chapter 4) were estimated using proposals submitted by suppliers for the major items of equipment and services and in-house estimation by the consultant for the balance. No specific contingencies were applied apart from conservation in the design. The total cost of the heating plant and pipeline distribution system is as follows:

Capital Cost	$ 9.4 million
Installation	4.3 million
Design	1.0 million
	$14.7 million

Operating Cost

Costs (Chapter 6) included were:

- revenues from the sale of heat over a range of prices including the prices of electricity and natural gas
- cost of auxiliary electrical supplies
- cost of oil and coal fuel supply to heating plant
- cost of operating and maintenance materials
- cost of trucking coal from mine to the heating plant and the ash to the disposal site

Fuel Cost	$ 295,000
Auxiliary Electrical Cost (1982 Dollars)	107,000
Labour	386,000
Materials	76,000
	$ 864,000
Annual Revenue (1982 Dollars)	$2,009,000

Results

The simple payback period is 12.5 years.

When the scheme is evaluated in Chapter 9 as a utility with a 40 percent equity and a selling price of energy matching that for natural gas ($7.50/GJ taking into account furnace efficiency) the internal rate of return is 14.5 to 19.1 percent depending upon the escalation rate.

A subsidy of approximately $4 million would be required to ensure that for each year, the cash flow before financing is always greater than or equal to the interest payable.

Several natural gas and pipeline companies made submissions to the B.C. Utilities Commission for the right to supply gas to Tumbler Ridge. The Commission favoured a proposal for supplying gas at $4.96/GJ which translates into $7.50/GJ taking into account furnace efficiency. Now that a gas distribution system is in place, the cost of gas is $5.57/GJ or $8.71/GJ considering efficiency. Because of the higher price of gas, than used in this report, the price of energy from a district heating system could be increased and still remain competitive. The increased revenues would substantially increase the rate of return and also decrease the subsidy required.

Conclusion

The District of Tumbler Ridge could not proceed with a district heating system without the financial support of the provincial government (Chapter 10). This support was not forthcoming either as a loan guarantee or as a subsidy because of the economic restraint measures being practiced by the provincial government.

RÉSUMÉ À L'INTENTION DE LA HAUTE DIRECTION

Introduction

Le chauffage urbain est un concept simple. Ses principales composantes sont une source centrale de chaleur, un réseau de canalisations installé dans un district de bâtiments servant au transport de l'eau chaude ou de la vapeur, et un moyen de communiquer la chaleur aux maisons particulières, aux immeubles d'appartements ou aux bâtiments commerciaux.

Tumbler Ridge, ville desservant le site de mise en valeur du charbon dans le nord-est de la Colombie-Britannique, est actuellement en cours de construction. Pour l'introduction du chauffage urbain, c'est un site idéal, les conditions de construction et autres conditions étant favorables. Par exemple:

1. les canalisations du réseau de distribution peuvent être installées lorsque les rues sont creusées pour l'installation d'autres services publics;
2. la chaufferie peut être installée au centre du réseau, ce qui permet de réduire le coût des canalisations;
3. les nouveaux logements en construction peuvent être conçus de façon à utiliser l'énergie de l'eau chaude pour le chauffage;
4. le combustible (charbon) du réseau est bon marché et abondant, et se trouve sur place.

C'est justement l'absence de ces mêmes conditions qui fait augmenter les coûts d'installation d'un nouveau réseau dans une ville existante.

La présente étude évalue la faisabilité d'un réseau de chauffage urbain, avec le charbon comme combustible, pour le district du Tumbler Ridge. Les caractéristiques et avantages du chauffage urbain, ainsi que le but et les méthodes de l'étude sont exposés au chapitre 1.

La faisabilité du projet est donnée au point de vue de la ville, c.-à-d., les coûts et avantages pour la ville, sans tenir compte de ceux qui sont attribuables aux consommateurs. La valeur actuelle nette (ou le prix auquel serait vendue l'énergie) nécessitait une marge pour inciter le consommateur à utiliser le réseau de chauffage urbain de préférence à une autre forme classique de chauffage.

Conception du réseau

La chaufferie décrite au chapitre 3 est basée sur des principes techniques prouvés pour l'énergie thermique et sa capacité est suffisante pour répondre à des défaillances ou faire face à une charge partielle. Le réseau comprend quatre chaudières, l'une alimentée au mazout et les trois autres au charbon, de capacité suffisante pour répondre aux besoins en chauffage de la ville. Le réseau de distribution par canalisations est conforme aux pratiques scandinaves standard avec boucles pour garantir le minimum de perturbations dans l'approvisionnement. Les pays scandinaves utilisent le chauffage urbain depuis plus de 60 ans.

Coûts en capital

Les coûts en capital (chapitre 4) ont été estimés à l'aide des propositions présentées par les fournisseurs pour les principales composantes de l'équipement et les principaux services et le reste a fait l'objet d'une estimation effectuée par l'expert-conseil. Aucune éventualité particulière n'est entrée en ligne de compte, à part les économies au niveau de la conception. Le coût total de la chaufferie et du réseau de distribution par canalisations est le suivant:

Coût en capital	9,4	millions de dollars
Installation	4,3	
Étude technique	1,0	
	14,7	millions de dollars

Coûts d'exploitation

Les coûts (chapitre 6) étaient les suivants:

- recettes tirées de la vente de chaleur pour une gamme de prix, dont les prix de l'électricité et du gaz naturel;
- coût des fournitures électriques auxiliaires;

- coût d'approvisionnement en mazout et en charbon pour la chaufferie;
- coût des matériaux d'exploitation et d'entretien;
- coût du transport, par camion, du charbon de la mine jusqu'à la chaufferie et des cendres jusqu'au site de dépôt.

Coût du combustible	295 000 $
Coût des fournitures électriques auxilaires (en dollars de 1982)	107 000 $
Main-d'œuvre	386 000 $
Matériaux	76 000 $
Recettes annuelles (en dollars de 1982)	2 009 000 $

Résultats

La période d'amortissement simple est de 12,5 ans.

Le projet est évalué au chapitre 9 en tant que service public avec un capital-actions de 40 % et un prix de vente de l'énergie comparable à celui du gaz naturel (7,50 $/GJ compte tenu du rendement des chaudières; le taux de rendement interne est de 14,5 à 19,1 % selon le taux de la hausse des prix.

Une subvention d'environ 4 millions de dollars serait nécessaire pour garantir que, pendant chaque année, les liquidités avant financement seront toujours plus élevées ou du même niveau que l'intérêt payable.

Plusieurs sociétés de distribution de gaz naturel et sociétés pipelinières ont demandé à la B.C. Utilities Commission le droit d'approvisionner Tumbler Ridge en gaz. La commission a retenu une proposition d'approvisionnement en gaz à 4,96 $/GJ, ce qui donne 7,50 $/GJ compte tenu du rendement des chaudières. Maintenant qu'un réseau de distribution de gaz est en place, le coût du gaz est de 5,57 $/GJ ou 8,71 $/GJ compte tenu du rendement. Étant donné que le prix du gaz est plus élevé que le prix utilisé dans le présent rapport, le prix de l'énergie produite à partir d'un réseau de chauffage urbain pourrait augmenter et demeurer malgré tout compétitif. Les recettes accrues feraient sensiblement augmenter le taux de rendement et feraient aussi décroître la subvention requise.

Conclusion

Le district de Tumbler Ridge n'a pu donner suite à un réseau de chauffage urbain sans l'appui financier du gouvernement provincial (chapitre 10). Cet appui n'a pas été fourni sous forme de garantie de prêt ni de subvention, en raison des mesures de restrictions économiques qu'a prises le gouvernement provincial.

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 Background

Tumbler Ridge is the townsite for the northeastern B. C. coal development. Approximately 5,000 to 6,000 people will be living in Tumbler Ridge by 1986. Planning for the townsite is already well underway; occupation of the first housing units will begin in the spring of 1983 while the commercial sector will be completed in the fall of 1982.

A consultant was commissioned to make an energy supply analysis for this townsite. The analysis carried out by Cogeneration Association Ltd. indicated that a district heating system was a technically and financially attractive heating option. As a consequence the District of Tumbler Ridge with the support of the B.C. Ministry of Energy, Mines and Petroleum Resources and Energy, Mines and Resources Canada engaged the services of a second engineering consultant Intercontinental Engineering Ltd. (Integ) to develop the district heating system beyond the conceptual stage.

District heating is simple in concept. The main components are a central source of heat, a network of pipes throughout a building district for the transportation of hot water or steam, and a means of heat exchange in individual houses, apartment blocks or commercial buildings.

Because Tumber Ridge is presently being built, this makes it a "greenfield" site, with construction and other conditions being favourable, for example:

- Pipes for the distribution system can be laid when streets are excavated for the installation of other utilities.

- Location of the heating plant can be centred to reduce pipe costs.

- New dwelling units being built can be designed to accommodate the use of hot water as energy for heating.

- Coal as fuel for the system is inexpensive, local and plentiful.

It is the absence of these very conditions which drives up the costs of installing a new system in an existing town.

1.2 Features of District Heating System

The district heating system would have the following features:

- A central heating plant comprised of four boilers with most of the heating demand being met by thermal and waste coal obtained from nearby mines.
- The boilers are designed to later permit burning of garbage and generation of electricity if desired.
- Staging of heating supply with an oil fired boiler for 1982 and 1983 and all coal thereafter.
- A distribution system of underground pipe to deliver hot water to all residences and businesses in the townsite.
- A meter and energy exchanger in each building.
- Creation of a district heat utility by the District of Tumbler Ridge.
- Coal will be supplied by nearby mines.

1.3 Benefits of a District Heating System

The town of Tumbler Ridge was proposed as a permanent community with one of its principles being the theme of energy conservation in a resource based community. The district heating option offers several benefits:

- the most efficient type of heating system;
- a demonstration of future technology;

- a logical energy choice for a coal exporting region;
- a heating system in which the fuel type is easily substituted;
- the opportunity to use waste heat in greenhouses;
- a long term waste disposal system for municipal garbage thereby reducing the environmental impact of the town;
- an opportunity for British Columbia to assume a technology lead in this area;
- an opportunity for the mining companies and the town to assist each other by the maximum use of waste coal at no cost.

1.4 Purpose of Study

The purpose of this study is to establish the costs of a district heating system for Tumber Ridge and a range of prices for which the heating energy could be sold in order that the Township could decide whether to proceed with the installation of a district heating system. Time constraint required the decision for the district heating to be made in April 1982 enabling the necessary lead times to be achieved from the detailed design, equipment procurement and construction work for a system in place by October 1982.

1.5 Staging

The district heating system was required to satisfy the phased growth of the township which comprised nine phases in three basic stages (see Exhibit 1).

Stage 1 covers building phases I, II and III over the period of Fall 1982 to Fall 1983 for which district heating energy would be provided by one oil fired boiler and one coal fired boiler.

Stage 2 covers building phases IV, V, VI, VII and X over the period of Fall 1983 to Fall 1985 for which an additional coal fired boiler would be added to the heating system.

Stage 3 covers building phases VIII and IX for the period of Fall 1985 onwards and for which a third coal fired boiler would be added to the heating system.

1.6 Method of Study

The study method adopted by Integ was as follows:

- estimate the consumer heat demands for space heating and domestic hot water, the heat losses in transmission/distribution and the oil and coal inputs required by the heating plant;
- layout and size the heating plant required to supply the heating demand;
- layout and size the transmission and distribution system to satisfy the construction schedule for the Township;
- estimate the capital cost of the transmission/ distributin system and heating plant using prices quoted by multiple manufacturers for major items and in-house estimating for the balance of equipment;
- estimate the system operating costs including auxiliary electrical energy, labour requirements, maintenance/replacement costs and coal and ash trucking costs;
- ascertain the prices for alternative conventional energy;
- carry out a financial analysis.

1.7 Addendum

Several natural gas and pipe line companies made submissions to the B.C. Utilities Commission for the right to supply gas to Tumbler Ridge. The Commission favoured a proposal for supplying gas at $4.96/GJ which translates into $7.50/GJ taking into account furnace efficiency. These figures are used in this report to establish a competitive price for energy from a district heating system.

Now that a gas distribution system is in place, the cost of natural gas is $5.75/GJ or $8.71/GJ considering efficiency. Because of the higher price of gas than used in this report, the price of energy from a district heating system could be increased and still remain competitive. The increased revenue would substantially increase the rate of return for a district heating system determined in this report and also decrease the subsidy required.

EXHIBIT 1

SMOOTHED HOUSING SCHEDULE

(incremental)

TUMBLER RIDGE: BASE CASE

OCTOBER 28, 1981

YEAR	PHASE*	DETACHED	ATTACHED	MULTIPLE	MOBILE	COMMERCIAL & INSTITUTIONAL (m^2)	TOTAL HEAT REQ'D GJ
1982	I,II,III	292	50	505	164	8,000	37
1983	IV,V,X	252	39	345	124	17,100	64
1984	VI,VII	189	27	0	78	10,000	72
1985	VIII	84	8	0	21	9,200	92
1986	IX	50	4	0	0	9,000	97
1987		24	0	0	0		
1988		44	2	0	0		
1989		43	3	0	0		
1990		43	2	0	1		
1991		0	0	0	0		
TOTAL		1021	135	850	388	53,300	

NOTES:
1.* All Commercial & Institutional buildings are in Phase I.
2. Heating plant stages 1, 2 and 3 relate to 1982, 1983 and 1985 respectively.
3. Construction after 1986 has been taken into account in the preliminary district heating design concept.
4. The total heat required takes into account the line losses and an 80% diversity factor.

SOURCE: District of Tumbler Ridge

CHAPTER 2

ENERGY DEMANDS

2. ENERGY DEMANDS

2.1 Consumer Heat Demands

The bases used for consumer heat demand calculations are:

- All buildings in the town are built to the "Measures" standards as published by National Research Council of Canada (1978). NRC #16574
- Smoothed Housing Schedule Exhibit 1 of this report.
- Annual heat consumption per housing unit from Saskatchewan Research Council. These consumptions are summarized in Exhibit 2 of this report.
- 100% penetration of the market i.e. all buildings will have available and utilize the district heating system.

2.2 Residential Space Heating and Domestic Hot Water

The calculated annual incremental and cumulative heat loads for residential space heating and domestic hot water are given in Exhibits 3 and 4.

2.3 Commercial and Institutional Space Heating and Domestic Hot Water

The space heating and domestic hot water demands were estimated using average consumptions per unit floor area. The average consumptions were then applied to the building schedule (Exhibit 1) to give the annual demands. The average consumption for space heating is 1.202 $GJ/m^2/yr$. The average consumption for domestic hot water is 0.0939 $GJ/m^2/yr$.

The calculated annual and cumulative heat demands for space heating and domestic hot water are given in Exhibit 5.

2.4. Heat Losses and Plant Output

The heat loss from a pipe system is a complex calculation dependent upon such parameters as pipe length, diameter, insulation type and thickness, circulating water temperature, depth of pipe burial, ambient temperature of ground at burial depth and heat transfer co-efficients through the interfaces of the different materials. Time constraints for this study preclude the calculation of these losses.

Based on tests performed in Scandinavia losses of 4% for high heat density loads and 12% for low heat density loads were measured. These figures were used in this study. Low heat density loads are assumed to be the residential heat loads excluding those of apartments. High heat density loads are assumed to be commercial/institutional and apartment heat loads. The total plant output was estimated as indicated in Exhibit 6.

It is noted that the overall heat loss derived is 23,900 GJ/year for the ultimate system (year 1990) giving an average of 9% of the consumer load. This compares with 7% reported for the Le Breton Flats district heating scheme.

EXHIBIT 2

RESIDENTIAL HEAT DEMANDS

(GJ/YEAR)

	Large Single	Small Single	Large Duplex	Small Duplex	Row Housing	Apartment Home	Mobile Home
Space Heating	85	65	64	49	44	24	76
Domestic Hot Water	24	24	24	24	22	20	22

SOURCE - Saskatchewan Research Council

EXHIBIT 3

RESIDENTIAL BUILDING UNITS AND DOMESTIC HOT WATER DEMANDS (,000 GJ/YEAR)

YEAR	L. SINGLE	S. SINGLE	L. DUPL.	S. DULP.	ROW	APT.	MOBILE	TOTAL HEAT DEMAND INCREMENTAL	CUMULATIVE
1982 No.	146	146	25	25	65	440	164		
,000 GJ/YR	12.4	9.5	1.6	1.2	2.9	10.6	16.4	54.6	54.6
1983 No.	126	126	19	20	45	300	124		
,000 GJ/YR	10.7	8.2	1.2	1.0	2.0	7.2	12.4	42.7	97.3
1984 No.	94	95	14	13	0	0	78		
,000 GJ/YR	8.0	6.2	0.9	0.6	0	0	7.8	23.5	120.8
1985 No.	42	42	4	4	0	0	21		
,000 GJ/YR	3.6	2.7	0.3	0.2	0	0	2.1	8.9	129.7
1986 No.	25	25	2	2	0	0	0		
,000 GJ/YR	2.1	1.6	0.1	0.1	0	0	0	3.9	133.6
1987 No.	12	12	0	0	0	0	0		
,000 GJ/YR	1.0	0.8	0	0	0	0	0	1.8	135.4
1988 No.	22	22	1	1	0	0	0		
,000 GJ/YR	1.9	1.4	0.1	0	0	0	0	3.4	138.8
1989 No.	22	21	1	2	0	0	0		
,000 GJ/YR	1.9	1.4	0.1	0.1	0	0	0	3.5	142.3
1990 No.	21	22	1	1	0	0	1		
,000 GJ/YR	1.8	1.4	0.1	0	0	0	0.1	3.4	145.7
LOAD/UNIT (GJ/YEAR)	85	65	64	49	44	24	100		

EXHIBIT 4

RESIDENTIAL BUILDING UNITS AND DOMESTIC HOT WATER DEMANDS (,000 GJ/YEAR)

YEAR	L. SINGLE	S. SINGLE	L. DUPL.	S. DULP.	ROW	APT.	MOBILE	TOTAL HEAT DEMAND INCREMENTAL	TOTAL HEAT DEMAND CUMULATIVE
1982 No.	146	146	25	25	65	440	164		
,000 GJ/YR	3.5	3.5	0.6	0.6	1.4	8.8	3.6	22.0	22.0
1983 No.	126	126	19	20	45	300	124		
,000 GJ/YR	3.0	3.0	0.5	0.5	1.0	6.0	2.7	16.7	38.7
1984 No.	94	95	14	13	0	0	78		
,000 GJ/YR	2.3	2.3	0.3	0.3	0	0	1.7	6.9	45.6
1985 No.	42	42	4	4	0	0	21		
,000 GJ/YR	1.0	1.0	0.1	0.1	0	0	0.5	2.7	48.3
1986 No.	25	25	2	2	0	0	0		
,000 GJ/YR	0.6	0.6	0.1	0	0	0	0	1.3	49.6
1987 No.	12	12	0	0	0	0	0		
,000 GJ/YR	0.3	0.3	0	0	0	0	0	0.6	50.2
1988 No.	22	22	1	1	0	0	0		
,000 GJ/YR	0.5	0.5	0	0	0	0	0	1.0	51.2
1989 No.	22	21	1	2	0	0	0		
,000 GJ/YR	0.5	0.5	0	0.1	0	0	0	1.1	52.3
1990 No.	21	22	1	1	0	0	0		
,000 GJ/YR	0.5	0.5	0	0	0	0	0	1.0	53.3
LOAD/UNIT (GJ/YEAR)	24	24	24	23	22	20	20		

EXHIBIT 5

COMMERCIAL/INSTITUTIONAL FLOOR AREAS, SPACE HEATING AND DOMESTIC HOT WATER DEMANDS (,000 GJ/YEAR)

YEAR	FLOOR AREA (m_2)	SPACE HEATING		DOMESTIC HOT WATER	
		INCREMENTAL	CUMULATIVE	INCREMENTAL	CUMULATIVE
1982	8,000	9.6	9.6	0.8	0.8
1983	17,100	20.6	30.2	1.6	2.4
1984	10,000	12.0	42.2	0.9	3.3
1985	9,200	11.1	53.3	0.9	4.2
1986	9,000	10.8	64.1	0.8	5.0
1987	0	0	64.1	0	5.0

Average space heating demand 1.202 GJ/ m^2/Year

Average domestic hot water demand 0.0939 GJ/ m^2/Year

EXHIBIT 6

TRANSMISSION AND DISTRIBUTION HEAT LOSSES (,000 GJ/YEAR)

YEAR	LOW DENSITY		HIGH DENSITY		TOTAL PLANT DEMAND	
	CONSUMPTION	LOSS @ 12%	CONSUMPTION	LOSS @ 4%	INCREMENTAL	CUMULATIVE
1982	57.1	6.9	29.8	1.2	95.0	95.0
1983	46.1	5.5	35.4	1.4	88.4	183.4
1984	30.3	3.6	12.9	0.5	47.3	230.7
1985	11.6	1.4	12.0	0.5	25.5	256.2
1986	5.3	0.6	11.6	0.5	18.0	274.2
1987	2.4	0.3	0	0	2.7	276.9
1988	4.5	0.5	0	0	5.0	281.9
1989	4.5	0.5	0	0	5.0	286.9
1990	4.4	0.5	0	0	4.9	291.8

CHAPTER 3

SYSTEM DESCRIPTION

3.0 SYSTEM DESCRIPTION

3.1 Heating Plant

3.1.1 Mechanical System

The proposed heating plant consists of an initial installation of one oil fired, fire tube packaged boiler complete with all necessary auxiliaries and the subsequent addition of three coal fired travelling grate water tube tower boilers complete with all auxiliaries. The installation of the additional boilers is phased coincident with the projected load growth of the district heating requirements.

- Oil Fired, Fire Tube, Packaged Boiler

  The proposed oil fired boiler will have a capacity of 20 GJ/hour, producing high temperature hot water, when fired with either heavy or light oil. The oil is stored in two separate storage tanks each having a capacity of one day supply for light oil and two days for heavy oil.

  The heating system for heavy oil heating consists of a hot water coil in the tank based with a recirculating facility on the oil pump discharge; however for times of cold starting an electric oil heater has been included.

- Heat Exchangers

  The hot water produced by the boilers is circulated through two plate type heat exchangers (one per boiler) where heat is transmitted to the distribution water system. Thus each boiler, pump, and heat exchanger circuit is a closed loop system, ensuring more accurate control of circulation rate, return temperature and boiler water quality.

- Distribution System Pumps

  In the initial installation, two 100% pumps are installed on the distribution system for circulation of district heating water. As the system loads increase additional similar sized pumps are added until four pumps are installed any three of which can carry the full load requirements.

- Coal Fired Boilers

One 20 GJ/hour and two 40 GJ/hour coal fired boilers will be installed. For the boilers of 40 GJ/hour heating capacity, this translates into 40,000 lb/hour of steaming capacity of saturated steam at 3.5 Atmosphere gauge pressure. The steam is piped to a Deaerator/-Heater tank where it will condense into water thus transferring the latent heat to the heat exchanger circuit. The boiler feed pump draws water from the expansion tank for reinjection into the boiler, simultaneously with the circulating pump drawing from the expansion tank and recirculating through the heat exchangers. This system of steam to water heat exchange was selected to be compatible with the possible future installation of an electrical generation facility, since the exhaust steam would be utilized in exactly the same system. To this end the boilers have been designed for later upgrading to operate at 40 atmospheres gauge pressure (600 psig). The boilers are supplied complete with the following sub-components:

Forced Draft Fans, Induced Draft Fans, flues and ducts, heat recovery system, valves, sootblowers, insulation, baghouse, platforms walkways, support steel and fuel feeders, tubular air heaters, and stack.

The fuel feed system consists of an inground hopper for receiving coal from trucks from which the coal is transferred by scraper conveyor to a storage hopper. The feed from the storage hopper to the boiler feeders takes place automatically by a totally enclosed scraper conveyor feeding directly into the boiler feeders.

Ash produced in the boilers is collected by a submerged dragbar conveyor which transports the wet ash to the ash silo feed conveyor. The ash silo outlet is elevated 5m above ground level and is equipped with a dust conditioner for direct discharge into road vehicles. It is presumed that trucks delivering coal to the plant can be utilized for ash transportation back to the the mine for disposal.

- Auxiliary systems incorporated into the plant consist of compressed air, fire protection, and water treatment.

- The compressed air system consists of a small oil free compressor and a limited distribution system sufficient to distribute to each of two sections of the plant at ground level. Air receivers, dryers and automatic drains are also included.

- Fire protection consists of a hydrant and sprinkler system connected to the town main supplemented by a portable diesel driven pump for emergency use. Consideration should be given to the installation of foam making equipment for oil tank protection, however, this has not been included in the capital cost estimate.

- Water Treatment

  The water treatment system is designed as a total package suitable for the treatment of town water to produce water of a quality suitable for both the boiler and the distribution pipework. The unit costs of an integrated package including, ion exchange vessel, regeneration equipment, dosing system, storage tanks, pumps and control system. Regeneration of the resin bed will be required approximately once per week and can be initiated by pushing a button which will then complete the entire regeneration cycle. Effluent from the backwashing process is expected to be neutral with high levels of non-toxic calcium and magnesium salts.

  See Dwg. No. 0211-004-SK01, 0211-004-SK03, 0211-004-SK04, 0211-004-SK05, 0211-004-SK06 in Appendix A.

3.1.2 Electrical System (Ref. Dwg. No. 0211-004-SK08 in Appendix A)

- Power Supply to Plant

Power will be supplied to the heating plant by B.C. Hydro, from their 230 kV - 25 kV substation at Tumbler Ridge. Separate 25 kV lines will be run overhead along Road 10 and underground along Road 40 or 70, and a service from each of these lines will be run to the plant substation. These services will be run underground by means of cable in concrete encased duct.

Substation

The substation will be rated 1500 kVA, 24.94 kV (125 kV BIL) - 600 Volt, 3 phase. It will be located out-of-doors. It will be completely metal enclosed, and weatherproof, and will comprise a high Voltage section, a transforming section and a low Voltage section.

The high voltage section will comprise two disconnect switches and two load break switches (one disconnect and one load break switch for each incoming service), and one set of intermediate type surge arresters, one set of current limiting power fuses, a compartment for B.C. Hydro metering transformers and a compartment for B.C. Hydro meters. The bus and switches have a momentary rating, and the load break switch will have a fault closing rating of not less than 20 kA rms asymmetrical. The fuses will have an interrupting rating of not less than 500 MVA at 25 kV. The disconnect and load break switches, and the fuse compartment and metering transformer compartment doors will all be key interlocked so as to ensure safe operation. The economics of secondary metering will be investigated, and secondary rather than primary metering will be provided if secondary metering is found to be more economical.

The transforming section will contain three 500 kVA, 14.4 kV (125 kV BIL) - 600 Volt single phase transformers. Approximately 20 to 25 percent of the total transformer capacity of 1500 kVA will be available for future additional load. The transformers will be connected (ungrounded) wye-delta, to permit continued operation of the substation at 57.7 percent of rated kVA capacity from reconnected open (grounded) wye-open delta, in the event of failure of one of the transformers. The transformer reactance will be approximately 4.5% and chosen so as to limit short circuit currents on the 600 Volt system to 42 kVA rms symmetrical and to the asymmetrical rating of the diesel generator automatic transfer switch.

The low Voltage section will contain the terminations of transformer secondary cables run underground in concrete encased ducts to the low Voltage distribution switchgear in the plant electrical room.

- Low Voltage Switchgear

The low Voltage distribution switchgear will be rated 600 Volts, and will be braced for, and capable of interrupting short circuit currents of up to 42 kA rms symmetrical. Drawout air circuit breakers will be provided as follows: Incoming or transformer secondary (2000 Amp frame size), oil fired boiler motor control centre (1600 Amp frame size) and coal fired boilers motor control centre (1600 Amp frame size). The breakers will be manually operated, except that the incoming breaker will be electrically operated so as to permit remote synchronising when transferring the substation load to the B.C. Hydro system, if a steam turbine generator is installed in the future. Depending on the location finally chosen for the plant substation, the incoming or transformer secondary breaker may be relocated to the low Voltage section of the substation. The switchgear will be arranged to permit future extension for the additional breakers required if additional boilers and/or a turbine generator are installed.

The 600 Volt electrical system will be grounded by means of an artificial neutral connected to the bus in the distribution switchgear. Ground detection equipment will be provided to sound an alarm in the event of a short circuit to ground, and to trip one or more breakers so as to disconnect grounded circuits in the event of simultaneous grounds on two circuits.

- Motor Control Centres

Two motor control centres will be provided: one for the coal fired boilers and one for the oil fired boiler. Plant services will be divided between the two motor control centres in accordance with the services' relationship to the coal and oil fired boilers, except that some lighting circuits throughout the plant will be supplied from the oil fired boilers motor control centre, so as to provide some lighting throughout in the event of a B.C. Hydro power outage. In this event, non-essential lighting connected to the oil fired boiler motor control centre will be automatically disconnected. The four district heating pumps will be connected two to each motor control centre, and one of the two connected to the oil fired boiler motor control centre will be arranged to start automatically if one of the remainder should fail. The motor control centre for the coal fired boilers will be installed in Stages II and III of the plant.

The bus in the motor control centres will be braced for short circuit currents of up to 42 kA rms symmetrical. Because of this relatively high fault level, individual feeders and starters will be provided with switches with NEMA class J or L current limiting fuses, rather than moulded case circuit breakers.

The motor control centre wiring and manufacturer's wiring drawings will be EEMAC class I, type B. A common control circuit transformer and panelboard will be provided. All push-buttons, selector switches and indicating lights will be mounted on pushbutton stations located adjacent to the mechanical equipment controlled, rather than on the motor control centre.

- Diesel Generator

In order to permit operation of boiler capacity sufficient to prevent freeze-up of the district heating system in the event of a prolonged power outage on the B.C. Hydro System, or possibly due to equipment failure within the plant substation, low Voltage switchgear, or cables, a standby diesel generator will be installed. It will be located in a room separate from the plant electrical room. It will be provided with means for automatic start-up and connection to the oil fired boiler motor control centre in the event of a power supply failure to that motor control centre.

The generator will be rated approximately 375 kVA, 0.8 power factor, 300 kW, and the diesel engine will be rated not less than approximately 250 kW for prime power applications and 300 kW for standby applications. The diesel will meet applicable exhaust emission requirements.

The diesel will be radiator cooled, with automatic dampers on the air inlet and outlet to the diesel generator room, and with replaceable filters on the air intake, if necessary, depending on the room and air intake's final orientation in the plant.

The diesel engine governor will provide approximately 3 percent speed (frequency) regulation. The engine instrument panel will provide indication of fuel pressure, lubricating oil pressure and jacket water temperature.

The generator will be of the brushless type, with a static regulator to provide plus or minus 2 percent voltage regulation.

The generator control panel will contain a moulded case generator circuit breaker (400 Amp frame size) and a 600 Amp automatic transfer switch. The switch will have fault closing, momentary and short time ratings of 42 kA rms symmetrical (asymmetrical ratings to

be specified). The control panel will also contain the necessary controls to start the diesel on loss of Voltage on any phase, delay transfer of load until after the diesel is up to speed, retransfer after a time delay on restoration of power, and shut down the diesel after a cool down period, running unloaded. Means will be provided to test this sequence. Also, the controls will provide several crank and rest cycles in order to start the diesel. Indication and alarm will be provided of failure to start, low lubricating oil pressure, high jacket water temperature and engine overspeed.

The portion of the 600 Volt electrical system when supplied by the diesel generator will be grounded by means of an artificial neutral connected to the bus in the generator control panel. Ground detection equipment will be provided to sound an alarm in the event of a short circuit to ground.

- Lighting

Lighting in the boiler room will be by means of metal halide (white light) or high pressure sodium (slightly pink/orange light) lamps in self ballasted fixtures. Similar lamps in outdoor fixtures mounted on the building walls will provide exterior lighting where necessary. Fixtures with such lamps which are connected to the oil fired boiler motor control centre and are supplied from the diesel generator during a power outage will be equipped with tungsten halogen standby lamps arranged to be lit during the warm-up period of the main lamps. Lighting related to the coal fired boilers will be installed in Stage II of the plant. Lighting in rooms other than the boiler room will be fluorescent. Emergency lighting will be provided where necessary by means of remote light heads supplied from a central battery and charger unit located in the electrical room.

- Fire Alarm System

  A fire alarm system will be provided, with heat and smoke detectors as suitable for their location in the plant, connected to a central annunciator.

- Wiring Method

  The wiring method proposed for lighting, power and control, and fire alarm wiring will be R90 X-Link in electrical metallic tubing with raintight (dustight) connectors, run on Unistrut or similar racks except that rigid steel conduit will be used within 6 feet of floors and walkways, and where mechanical damage may occur. Boxes will be dustight with gasketted covers and threaded hubs or the equivalent.

  The electrical installation will meet the requirements of the B.C. Electrical Code, for class II, Division I, Group F hazardous locations, if and where required by the Electrical Safety Branch.

- Telephone System

  Conduits will be provided for installation of telephone wiring by B.C. Telephone.

3.1.3 Instrumentation and Controls

- General

  The simplest instrumentation and control system compatible with adequate performance of the plant will be selected. It is assumed that adequate operating manpower will be available but that manpower skilled in the maintenance and trouble-shooting of sophisticated instrumentation and control systems will be in short supply.

  Where possible instrumentation and control systems will be purchased with the major equipment they serve to maximize major equipment supplier overall responsibility, examples are:

Boilers, coal handling, ash handling, deaerators, chemical dosing, heat exchangers, water treatment, etc.

- Hot Water System

  Circulating Heating Water

  Flow rate will vary depending on user demand and will be recorded. Bypass lines will be provided where necessary to guarantee the minimum flows required to prevent overcooling of the system.

  Variations in user demand will result in variations in discharge header pressure. These variations will be used to indicate to the operator that more or less circulating pumps are required in service.

  Flow, pressure and temperature of the circulating water will be recorded. Water temperature will be varied by outside air temperature to reduce the variations in circulating water temperature flow.

- Circulating Water Pumps

  Each pump will be provided with a minimum flow recirculation valve controlled by the pump suction flow. This is intended to protect the pump under abnormal conditions and an alarm will be sounded if low flow occurs while the pump is running. The pump recirculation water will be returned to a head tank. To minimize the frequency of pump starts and stops, a bypass valve common to all the pumps will be provided. This will be controlled by the pressure of the circulating water discharge. Increasing pressure will tend to open the valve and vice-versa. If the valve is fully open and the header pressure rises to a pre-determined value, the operator will be warned to stop a pump. Similarly if the valve is fully closed, and the head pressure falls to a predetermined value, the operator will be warned to start a pump.

- Oil Fired Boiler

  This will produce hot water which, via heat exchanger will heat the circulating water. The temperature of the circulating water discharge from the heat exchangers will control the firing rates of the boiler and outside air temperature will be used to modify the set points of the controllers. To ensure the temperature of the water returning to the boiler does not fall below a predetermined value, valves bypassing the heat exchanger and controlled by the heat exchanger return water temperature will be provided.

  To cater for expansion and contraction of the close circuit boiler water system, expansion tanks and pressurizing pumps and back pressure regulators are provided. With low pressure in a system the pressurizing pump will run under the control of a pressure switch. Once the pressure is normal, the pressure switch will stop the pump. If, due to expansion, the pressure rises, the self contained back pressure regulator will open and allow water to flow back into the tank. Each tank is provided with a high level overflow to drain and also a level switch which opens a makeup water valve if the tank level becomes low. To protect the pumps in the event of failure of the makeup water supply or tank level control, extra low level switches will be provided which will also stop the pumps and sound an alarm.

  Dedicated chemical dosing pumps feeding from a common mixing tank are provided.

- Coal Fired Boilers

  These will produce steam which will be used directly to heat water in dedicated deaerators. Each deaerator will be provided with an overflow valve controlled by a high level switch. A level switch will open a makeup water valve if the deaerator level becomes low.

The temperature of the condensate in each deaerator will be used to control the firing rate of the associate boiler. Condensate is returned to the boiler by feed pumps via a valve controlled by the boiler drum level. It is also pumped through heat exchangers, (2 per boiler) which heat the systems circulating water.

Each deaerator will be provided with an extra low level switch which will stop the feed and return pumps and sound an alarm.

The temperature of the circulating water discharge from the heat exchangers will control the rate of flow of condensate through the heat exchangers via control valves. Outside air temperature will be used to modify the set points of the controllers.

- Make-Up Water

The make-up water for the boilers and circulating system will be treated and stored in a tank. Each make up line will be provided with a non return valve to prevent back flow. In addition, a non return valve will be provided in the discharge line of the makeup water transfer pump. Since the requirement for makeup water will be intermittent, the pump will be controlled by a pressure switch located downstream of the pump discharge non return valve. If any of the makeup water control valves are open, the makeup water header pressure will be low and the pressure switch will start the pump. When all of the makeup water valves are closed, the pressure switch will stop the pump.

Control of the level in the storage tank will be by a high level overflow of a level switch which will control a valve in the tank inlet. To protect the makeup water pump in the event of failure of the treated water supply or tank level control, an 'extra low' level switch will be provided which will stop the pump and sound an alarm.

- Water Treatment

A water treatment system consisting of a cation unit, degasifier, degasifier blower, transfer pumps, pot feeder, acid storage tank, acid day tank, acid pump and mixing station will be provided. Sequence control of the heating and regeneration cycles will be provided by a control panel and all necessary automatic valves.

3.1.4 Civil/Structural Aspects

- Scope

The civil/structural engineering work entailed in the construction of the district heating plant and the distribution pipe network can be summarized as:

- Geotechnical Aspects

It will be necessary to substantiate soils investigations that have been carried out for the townsite area by further test pits at the heating plant location. The purpose of these will be:

a) To confirm safe bearing pressure values in the design.

b) To assess the required depth of foundations to resist the effects of frost action.

c) To assess the ease of excavating the gravel/boulder subsoil presumed to exist at the plant location.

Certain economical advantages might be realized by raising the grade slab elevation and reducing the amount of foundation excavation by using the plentiful granular material available at the site as thick fill layers under the slab and immediately around the building for frost protection.

- Civil Engineering Aspects

- Heating Plant

The foundations would be a relatively simple arrangement of isolated footings and grade beams. Major equipment foundations would be independent mat foundations.

There will be major pipe and service trenches within the grade slab the layout of which will be dependent upon final mechanical layouts.

The final plan size of buildings will be revised if necessary to accommodate future refinements in the mechanical arrangements.

- Distribution Pipe Network

The layout of the heat distribution piping, valve boxes, expansion points, anchor blocks for the various phases will be co-ordinated with existing and future layouts of municipal services, roads and sidewalks.

The excavation of trenches will be monitored to eradicate pockets of frost suseptible soil. In general the pipework will be covered by a minimum of 400 mm of select granular fill and topsoil.

- Heating Plant Structure

The plant building would be a braced structure of simple columns supporting trussed roofs of about 22 mm width. The building will be about 46 m long half of which is about 9 m high over the oil fired boiler, the rest of which would be 16 m in height over the coal fired units to be installed in Stages II and III.

The internal access arrangements will be a combination of equipment vendor supplied platforms and supplementary platforms as required for efficient maintenance.

A lightweight steel partition will be provided between the oil fired and coal fired units to act as dust proof barriers.

- Architectural and Landscaping

Prior to commencing the final architectural design of the plant the architectural and landscaping requirements would be assessed. These would be established by liaison with the townsite architects and planners.

3.2 Distribution System (Ref. Dwg. No. 0211-004-SK07 in Appendix A)

- General Description

The proposed district heating distribution system is a closed loop, low temperature hot water system utilizing factory-insulated pipe. The steel carrier pipe with the insulation of rigid polyurethane foam will have an outer covering of impact resistance high density polyethylene. The supply and return pipes will be buried side by side under the side-walks. The location of the district heating plant is proposed near the intersection of Road No. 10 with Road No. 40, in the south-east corner of the town centre. The distribution system could be arranged using two basic philosophies:

1) Originating at the plant, the supply lines radiate in the direction of specific areas, each supply side radial artery diminishing in diameter as hot water is tapped along it's path.

2) A large diameter main running along Road No. 10 will supply loops on both sides of the road. Each loop will also be connected to it's neighbouring loops, so as to create a ring-main system, wherever this can be achieved at minimal cost.

The first alternative would yield a system with the shortest possible pipe-runs and also achieve an economy of pipe diameter sizes. However, it does not provide any redundancy of supply and in case of a break on the line, the entire line will have to be shut down, or provision for a portable water heating and pumping unit will have to be made.

The second alternative would provide a totally integrated distribution network so that in case of a fractured main, only a small section of the loop will have to be isolated. Another advantage of this system would be the flexibility it would allow for future expansion of the town beyond Stage III. The disadvantages of this system are that comparatively longer lengths of pipe-runs would be required and the proportion of large diameter piping and fittings required would be higher than in the first alternative.

The proposed piping system uses a combination of both philosophies. Using the system as shown in sketch no. 0211-004-SK07, in Stage I of the development, (i.e. for Phases 1, 2 and 3) the supply for phases 2 and 3 is via two sources. The same degree of redundancy is not provided for in future stages on the grounds of reducing the cost of material and installation. However, in case of a breakdown, a temporary short interconnection between the loops could be made, thereby providing a degree of redundancy, although the heat available from this inter-connection would be substantially lower than in a full ring-main system.

- Outline of the Piping System

A conservative flow velocity of 0.91 m/s was chosen to lessen the pump duty. Given the length of time to prepare the design and costing of the distribution system, it was not possible to conduct exhaustive flow/pressure drop calculations. Instead, all the Stage 1 (Phase 1 to 3) pipe-sizes were based upon the analyses performed by Cogeneration Associates Ltd. (see Exhibit 7). In the following paragraphs, a summary of design aspects is provided for all the components of the distribution piping system.

- Pipe

  The steel core of the pipe is securely bonded to rigid polyurethane insulation at the manufacturing stage. The insulation is protected by an outside pipe made from high density polyethylene. Normally, steel pipes up to 125 mm diameter would be delivered in 6 metre lengths and diameters greater than 125 mm in 12 metre lengths.

- Tees

  Tees of various sizes are available. It can be seen that in Phases 2 and 3 of Stage 1, a large number of houses are located along a pipeline with the diameter of 200 mm or 150 mm. If an outlet tee for each house was taken off the main of this size, clearly the cost of fittings would be unacceptably high. To minimize the cost, the large diameter main will be tapped with a Ø 60 mm tee only every sixth house along the run. The individual 1 inch connections for the six houses would be provided from this Ø 60 mm header. Where feasible, tees would be replaced by a direct tapping of the main using a fillet weld.

- Expansion Devices

  Associated with each pipe diameter, the manufacturer supplies a figure for the 'installation length'. The piping must be arranged so that the distance between an anchor and the expansion facility should not exceed the specified installation length. The expansion stresses can be accommodated by following methods.: -

  a) Expansion bends - This inexpensive way of absorbing the thermal expansion of the pipe from cold (start-up) condition to hot (operating) condition is achieved by providing U, L or Z bends on the pipe-run. In many instances, the bends in road could be used to serve as expansion bends by placing the anchors in appropriate positions. However, this method is not considered suitable for large diameter main pipe because the resultant pressure drop on large quantities of water would require a heavy duty pump.

b) 'No Comp' method - This patented system has been used in Sweden since 1971 and some 800 miles of pipe varying in diameters from 24 inches to 3/4 inch - has been installed. This system utilizes the concept of 'fixing temperature' which is in-between the maximum operating temperature and the ambient temperature. The pipe-system is heated to this fixing temperature and final joints are made. At normal operating and shut-down conditions, the system is stressed, however the stresses are within acceptable value.

c) Expansion Joints - The bellows type of expansion joint is cold pulled to minimum length by means of pre-tensioning bolts. In operation, as the pipe expands to its hot position, the pre-tensioning bolt breaks off thereby transferring the bellows spring load onto the pipe. With the tensioning bolts broken, as the system contracts after the shut down, the bellows are also able to expand back to their neutral position.

Having compared the merits of the 'No Comp' system to those of expansion joints, it was decided to select the bellows type expansion joints for the following reasons:

1) The bellows type of system can be considered as an active system whereas the 'No Comp' system would be considered as a passive system. In general, an active system can be more accurately analyzed. In case of an expansion joint, the spring rate can be selected so that the bellows can undergo a large movement without imposing an excessive thrust on the pipe. The 'No Comp' system would be restricted to a maximum temperature differential from the fixing temperature. Any increase in these differentials due to exceptional weather conditions or plant excursions from the normal operating conditions would result in damage to the system.

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2) It is normal practice when using a 'No Comp' system on a factory insulated pipe to eliminate the anchor blocks and instead rely on friction force between the pipe and soil to provide the anchor force. This requires careful study of soil mechanics and a strict control in construction stage to ensure that the soil condition is uniform throughout. If concrete anchor blocks are used on the system, it would provide an additional degree of confidence in anchoring, however, the increased cost would reduce the economic advantage of the 'No Comp' system.

- Leak Detection

Several proprietary leak detection systems are available. These systems are developed by pipe manufacturers and take the form of two copper alarm wires embedded in the pipe-insulation. At joints, after completion of the weld, the alarm wires are joined by using a connector. A hygroscopic pad is placed between the pipe and the alarm wire. Any leakage would result in a short-circuit and set the alarm. This system does not provide any indication of the location of the fault. Fault location is provided by a permanently installed device. The fault locator constantly sends out encoded pulse signals along one of the alarm wires. If there is a short circuit, the pulses are reflected back and using a timer circuit, the locator indicates the distance to the fault. Each locator can monitor up to 1000 metres length of branch-free piping on each of it's four circuits. If the piping circuit contains many branches, the length of the circuit has to be reduced to about 500 metres.

Both of these systems were considered somewhat costly and liable to spurious alarms. A simple alternative would be to install a metering device on the make-up tank of the district heating system. During the normal operation of the system, there will be nominal leakages through pump glands and various other flanged joints. An alarm linked to the metering device on the make-up tank would be calibrated such that any increase in demand would trip the leakage alarm. The leak could be located by using a hand-held sonar device. The leak produces a characteristic high frequency hiss which can be readily identified by the operator.

- Venting and Draining

Venting and draining of the system would be achieved by using vent and drain valves in conjunction with the isolation valves. The distribution network would be set in with a slight gradient between two isolating valves. By placing the drain valve at the lower end of the pipe run and the vent valve at the upper end, the system can be readily flushed or filled. To avoid an overall sinking or raising of a pipe-run, the slope between successive isolation valves is alternated from positive to negative.

- Installation

Excavation of the trench is the first important stage in the installation of district heating piping. The dimensions of the trench are a function of the pipe diameter. The bottom of the trench should be levelled with at least 100 mm of stone-free sand and compacted. After the installation of pipe, another 100 mm layer of stone-free sand is compacted on top. After this, the remaining depth of the trench is back-filled with an optional stone-free material.

The district heating pipe is supplied in 12 metre lengths for diameters over 125 mm and in 6 metre lengths for diameters less than 125 mm. Care must be taken in unloading and storing to ensure that the pipe or insulation is not damaged. The pipes are butt-welded using electric arc welding, however gas welding may be used on smaller diameters to reduce weld contamination. During the welding process, pipe ends must be fitted with alu-shields or wet asbestos rope to avoid flame damage of polyurethane foam. After butt-welding the pipe, the joints are insulated. This is achieved by bolting on a fitting and pouring the two-compound liquid foam through the filling hole. The foam sets hard in a few minutes. The fitting is left on as a protection for the foam.

For large pipe sizes, a robust aluminum sheet is used instead of the fitting. As before, the liquid foam is poured into cavity formed by the aluminum sheets. A shrink sheet is then wrapped round the insulated joint and is secured by an adhesive sheet. The shrink sheet is further secured by heating it with soft gas flame. The joint is then shrunk by applying gas flame to the shrink sheet.

Various fittings such as bends, elbows, tees and reducers are installed in the same manner as the pipe joints. It is essential to have workers with sufficient skill and experience of pipe-in-pipe type of systems to supervise the installation.

- Examination, Inspection and Testing

The ANSI/ASME standard for power piping, B31.1, does not specify any mandatory radiography for pipes under 19 mm thick and requires only visual examination and inspection. However, recognizing the importance of high quality welds to ensure that there are no leaks or unacceptable defects, we would recommend radiographic examination and inspection of 20% of weld above 100 mm diameter. All

rejected welds must be repaired and 100% radiographed before acceptance. Radiography shall be performed in accordance with article 2 of ASME Section V and acceptance standards of ANSI/ASME B31.1 shall be applied.

In addition to radiography, all welds shall be visually examined.

The system shall be hydrostatically tested by using water at 1.5 times the design pressure for a minimum of 10 minutes. The hydro-test should be conducted before the trench is refilled.

- Scope of Further Analysis

Due to the short time available to conduct this study, all pipe sizes were taken from the analyses performed by Cogeneration Associates Ltd. of Toronto, Ontario. The final design of the distribution system will be based upon more rigorous analysis to optimize the pipe diameters. It is proposed to use the following computer programs to aid the optimal design.

a) PIPENET - This program simulates the steady state flow of a fluid through a system of pipes. The program requires input for topology, fluid properties, pressure and flow rates. The program calculates at various data points the local flow rates, velocities, pressure and pressure drops.

b) PSIS - This program is used for stress analysis of pipelines. The program performs finite element analysis using the displacement method and provides stresses and displacements of the structure at node points. The program has capabilities for handling non-linear problems such as those due to large displacements, material inelasticity and creep/relaxation effects. A variety of support elements are available including soil supports. This facility makes the program particularly well-suited for the analysis of buried pipe-lines.

EXHIBIT 7

DISTRIBUTION SYSTEM DESIGN PARAMETERS

Max Supply Temp.	-	120°C
Min Return Temp.	-	55°C
Design Pressure	-	1.033×10^3 kPa
Hydrostatic Test Pressure	-	1.55×10^3 kPa
Max flow velocity	-	1.52 m/s
Min flow velocity	-	0.91 m/s
Peak Capacity	-	1982 - 37 GJ/hour 1985 Onwards - 97 GJ/hour

DITCH LENGTHS

DIA.	STAGE 1 (metres)	STAGE 2 (metres)	STAGE 3 (metres)
400	474	0	0
300	400	0	0
250	206	0	0
200	1926	1873	937
150	1074	1417	708
100	1030	960	480
80	1020	1077	538
60	1585	1673	836
50	500	600	300
40	500	600	300
25	10263	11202	5601
	18978	19402	9700

NOTE: Length of pipe is twice the ditch length.

CHAPTER 4

CAPITAL COSTS

4. CAPITAL COSTS

4.1 Heating Plant

Prices were obtained for each of the capital equipment items, in most cases from two or three different suppliers. Each supplier was asked to also indicate installation times for the equipment. From the manufacturers estimates the installation cost for the whole plant was established. Pricing information is given in Exhibit 8.

4.2 Distribution Pipework

The cost figures for the distribution system were established by a combination of methods all starting from a layout and sizing shown in Drawing No. 0211-004-SK07 Appendix A.

Pipework lengths were taken off the drawings and supply prices obtained from five different suppliers. Pipe fittings were estimated by direct count of connections, branches and tees for each individual pipe size for the first stage of construction and estimates for subsequent stages were extrapolated. Excavation and backfill estimates were carried out in-house by use of unit prices and quantities.

The installation costs of the pipe system were established by in-house estimates, mechanical contractors bid price, pipe suppliers rule of thumb comparison, and information from the mechanical contractors who installed the Le Breton Flats district heating system.

4.3 Capital Expenditure Schedule

The schedule of payments is shown in Exhibit 9, each capital amount being assumed to be spent in October of the year, in accordance with the construction schedule.

4.4 Capital Costs of Consumer Equipment

Each consumer would have a flow meter and heat exchanger installed. A study was made comparing installed capital costs for equipment to provide domestic hot water and space heating within residential and commercial buildings using three distinct energy sources: electricity, natural gas and district hot water heating.

The costs to the consumer for the heating equipment are given in Appendix B. These data were provided by D.W. Thomson Consultants Ltd.

The estimated costs for the building heating systems, for the complete townsite were:

Energy Supply System	Estimated Cost
District Heating	$4,537,000
Natural Gas Heating	$6,362,000
Electrical Heating	$6,885,000

For the most part, the customers of a district heating utility would not be burdened with higher costs for the building heating systems. In fact, it would appear that most customers would benefit from connecting to a district heating utility.

EXHIBIT 8

CAPITAL COST OF HEATING PLANT AND DISTRIBUTION SYSTEM

		(1982 $)
1.0	Site Clearance and Improvements	170,867
2.0	Buildings and Structrues	1,129,260
3.0	Coal and Ash Handling	479,000
4.0	Oil Storage and Handling	77,000
5.0	Boilers (Oil Fired)	258,000
6.0	Boilers (Coal Fired)	2,731,000
7.0	Piping (Mechanical)	418,500
8.0	Piping (Distribution System)	6,672,000
9.0	Ducts and Supports	inc. in 6.0
10.0	Stack	inc. in 6.0
11.0	Miscellaneous Mechanical	466,400
12.0	Electrical System	819,850
13.0	Instrumentation (Includes Flowmeters)	541,000
14.0	Engineering I.P.M.	820,000
15.0	Testing and Radiog	125,000
		14,707,877

EXHIBIT 9

CAPITAL LAYOUT SCHEDULE FOR

HEATING PLANT AND DISTRIBUTION SYSTEM

(1982 $)

	PLANT	DISTRIBUTION	TOTAL
1982	3,259,000	3,114,000	6,373,000
1983	2,517,000	2,374,000	4,891,000
1984	0	0	0
1985	1,738,000	1,705,000	3,443,000
	7,504,000	7,193,000	14,707,000

CHAPTER 5

ENERGY COSTS

5. ENERGY COSTS

The energy related cost factors in the study are as follows:

- selling price for the district heating energy;
- buying price of oil for the boilers;
- buying price of coal for the boilers;
- buying price of electricity as auxiliary power to the plant;
- selling price of competitive energy forms i.e. natural gas and electricity.

5.1 Electricity

Residential consumer - Schedule 1101. It is assumed the consumer's loads other than heating will pay the basic charge and the first 550 kWh per 2 month period such that heating energy cost would be $.03404/kWh. This is equivalent to $9.453/GJ.

Commercial/Institutional consumer - Schedule 1220. It is assumed that the consumer loads other than heating will pay the basic charge and the initial 14,000 kWh per 2 month period such that the heating energy cost would be $0.03103/kWh. This is equivalent to $8.619/GJ.

In the year 1991 when the heating system has reached its ultimate capacity, the residential annual demand is 199,000 GJ/year (Exhibits 3 and 4) and the commercial/institutional demand is 69,100 GJ/year (Exhibit 5).

$$\frac{\$(199{,}000 \times 9.453) + (69{,}100 \times 8.619)}{(199{,}000 + 69{,}1000)}/GJ = \$9.239/GJ$$

This value of $9.239/GJ is increased by 10.5% due to the March 1982 rate increase. This gives $10.21/GJ as an average electricity selling price.

5.2 Natural Gas

Northland Gas Company's submission to the British Columbia Utility Commission was accepted. The selling price of gas in Tumbler Ridge would be $4.96/GJ. When a natural gas conversion efficiency for potential consumer's furnaces is employed the cost of gas becomes $7.50/GJ.

5.3. Fuel Oil

No. 6 fuel oil would be used by the district heating plant. Fuel oil price data was obtained from the proposals of natural gas supply companies to the B.C. Utility Commission for supplying gas to the town. A further price was obtained from Imperial Oil, Vancouver for delivery to Tumbler Ridge. This latter price being the most competitive was used. The October 1982 price of $.23/litre translates into $6.389/GJ.

Some lighter oil of higher cost would be required but the proportion of this would be so small that it would have a negligible effect on the overall fuel cost.

5.4 Coal

Denison Mines offered to the Township export grade thermal coal at approximately $50/tonne. The specific cost of this coal would be $1.63/GJ.

Teck Mines offered metallurgical grade export coal at approximately $60/tonne. Although this coal is of slightly better quality, its specific cost would be higher than that of Denison.

Waste coal is available at no charge. It is possible to mix waste coal with export grade coal for consumption in the boilers. The waste or reject coal are tailings or other coal rejected by the mining or upgrading process with an energy content not less than 4,000 BTU/lb. and an ash content not greater than 60%.

Maximum use of waste coal would be in mixtures of 25% export coal and 75% waste coal. The price of such a mixture would be $.858/GJ.

5.5 District Heating Energy

The selling price of heating energy is critical to the study since it represents the sole source of revenue. The selling price was related to the cost of electricity and was varied in the analysis as a percentage of that cost. A 100% selling price is equivalent to $10.21/GJ.

A range of selling prices for district heating energy was considered as a function of the coal fuel price ($.858/GJ to $1.63/GJ). The variation in the selling price of energy was sufficient to exceed, match and be less than the expected cost of natural gas heat at $7.50/GJ.

CHAPTER 6

OPERATING COSTS

6. OPERATING COSTS

Operating costs for the following non-energy related items have been estimated and included in the study:

Operating and maintenance staff

Operating and maintenance materials and replacement parts

Trucking of coal from the source to the power plant and of ash from the heating plant to the disposal site.

These items are described in more detail in the following sub-sections.

6.1 Operating and Maintenance Staff

Administrative staff have not been included since it would appear reasonable that municipal staff, employed for other purposes, could be utilized. Examples of these are:

Project Manager - The 1st Class engineer engaged for operating duties could provide the overseeing function during the project's design and construction phases.

Invoicing Clerks - Municipal clerks could provide these services as part of their general duties.

Typist/Receptionist - It is assumed the township would engage such a person for general municipal duties.

Meter Readers - It is assumed that this function could be provided by, say, B.C. Hydro.

Other staff required for plant operation and maintenance are estimated to be:

1st Class Engineer @ $67,500/yr.	1 for 1982 & onwards
2nd Class Engineer @ $46,900/yr.	3 for 1982
	4 for 1983 & onwards
Lead Pipe Fitter @ $37,500/yr.	1 for 1982 & onwards

Pipe Fitter/Welder @ $33,700/yr.	1 for 1982 & onwards
Handyman/Excavator Driver @ $30,000/year	1 for 1982 & onwards

The annual rates for the above staff include a 50% allowance for employee fringe benefits and general costs associated with maintaining and equipping staff such as stationery, furnishings, document reproduction, phone charges, protective clothing.

6.2 Operating and Maintenance Materials

The estimate of these costs include for items such as the following:

- Supply of water to clean, flush and first-fill the distribution system.
- Chemicals for the water treatment systems lube oil, greases, etc.
- Replacement parts for the heating plant equipment.

No allowance has been made for replacement parts for the transmission/distribution system since information received from Swedish consultants indicate that historically no maintenance has been required in actual operating service and since the installed equipment has a minimum life span of 30 years. The cost estimate is therefore based on an annual cost of 1% of capital cost of installed heating plant equipment.

6.3 Coal and Ash Trucking

The cost of trucking will be dependent upon factors which cannot be determined at this stage of the project. Typical options are:

- Use of small, independent local operator. The costs of the operation could be low but its continued availability throughout the 30 year life of the analysis may not be assured.
- Use of a larger, union operator. The costs of this operation may be higher but more reliance could be placed on its continuing availability.

- Extension of the hauler's contract with the local mining company(s). Teck appear to rely on trucking to convey coal from the mine to the railhead. Denison are planning to ship the coal by belt conveyor but would require temporary trucking when production is switched from one pit to another. Such an operation's cost is considered to be representative for the needs of this study.

No definite plans are available for disposal of the heating plant's ash. It has been assumed, and Denison have stated their agreement to the concept, that the mining company would dispose of the ash together with the mines' spoil, wastes or tailings. This arragement would have some overall environmental benefits since it avoids the necessity of a second disposal site with its attendant monitoring and other facilities and consequent costs. INTEG consulted three large trucking companies which expressed interest in the operation and provided price information.

A price of $2.00/short ton ($2.22/Te) was used. This was based on data by Trimac of Calgary and the assumption that Trimac would be operating in Tumbler Ridge on the main mine haul. Trimac's price was raised from $1.90 to $2.00/short ton, applicable only to the coal trucking, to allow for "free" backhaul of ash to the mine. The increase allows for ash loading and unloading time on every 10th coal haul trip but no labour or fuel cost since the return journey would have to be made in any case.

CHAPTER 7

ALTERNATIVE TECHNICAL OPTIONS

7. ALTERNATIVE TECHNICAL OPTIONS

Prior to the establishment of a capital cost of $14.7 million as given in the Capital Cost Chapter of this report, an analysis was carried out on systems which would cost $16.5 million. The monetary difference between these systems is due to some optimization of the pipe network and some streamlining of the heating plant equipment. At a cost of $16.5 million, the following three options were analyzed:

7.1 Scenario X

In the first year (1982) the district heating plant would use oil as the only fuel source and in subsequent years use coal as the only fuel source. The plant would comprise two 20 GJ/h boilers (one oil fired and one coal fired) for the first year with the subsequent two 40 GJ/h coal fired boilers being installed as previously scheduled. The 20 GJ/h coal fired boiler would be supplied with an oil nozzle to enable its use in the first year until a definite source of coal could be established. The sole use of oil as a fuel for 1982 therefore represents a worse case condition. The small oil fired boiler would be retained for emergency use in subsequent years.

7.2 Scenario Y

Only oil would be used in the first year and then as a peak load and summer load fuel in the subsequent years. This scenario assumes two 20 GJ/h oil fired boilers and two 40 GJ/h coal fired boilers.

7.3 Scenario Z

This is the same as Scenario X except that the first year's load is halved to accommodate a delayed building schedule. The following year (1983) is assumed to have accelerated building such that the cummulative load is the same as Scenario X.

Revenue and fuel costs	- halved for 1982 - as original schedule for remaining years
Aux electric load	- halved to $12,400 for 1982 - as original schedule for remaining years
Labour	- halved to $150,000 for 1982 - as original schedule for remaining years
Materials	- reduced for 1982 due to reduced capital investment in the heating plant - as original schedule for remaining years
Capital Cost	- $5,242,000 transferred from 1982 to 1983

The smaller heat demand for 1982 would have a very small, local distribution system with a 20 GJ/h oil fired boiler situated local to the tower centre. For 1983 the plant expansion would be one 20 GJ/h and one 40 GJ/h coal fired boiler. The remaining 40 GJ/h coal fired boiler would be installed in 1985 in accordance with the original schedule.

The oil fired boiler would be retained for emergency use after 1982.

CHAPTER 8

FINANCIAL CRITERIA AND PARAMETERS

8. FINANCIAL CRITERIA & PARAMETERS

8.1 Comparison of Scenarios 'X', 'Y' & 'Z'

"Low" and "high" escalation rates were required for the financial analysis. The low escalation rate related to zero real escalation for energy selling price and for coal price. The high escalation rate related to 2% p.a. real escalation of these prices.

To ensure other parameters escalated at rates appropriate for the two conditions, the following specific escalation rates were proposed.

Parameter	Low Escalation (% p.a.)	High Escalation (% p.a.)
Inflation rate	10	10
Energy selling price	10	12
Oil price 1982-1985	15	15
1986 onwards	10	12
Coal price	10	12
Electricity price	10	11.5
Labour	10	11
Materials	10	10
Trucking	10	11
Interest	15	15
Discount	16 & 18	16 & 18

These escalation factors were used for the comparison of three scenarios 'X', 'Y' and 'Z', each with a project capital cost of $16.5 million.

Other parameters used were as follows:

Energy selling price	100% = $10.21/GJ
Oil price	$6.389/GJ
Coal price (Oct'82 levels)	100% = $1.63/GJ
Trucking price	$2.22/Te

Annual inputs used were as follows:

Scenario 'X'	Exhibit 10
Scenario 'Y'	Exhibit 11
Scenario 'Z'	Exhibit 12

8.2 Scenario 'X' - Subsequent Analyses

As Scenario 'X' was determined to be the most realistic and attractive option, further analyses were performed on this scenario. The variation X_1 applied to the case using a mix of 25% full price export coal and 75% free reject coal.

The project capital cost used was $16.5 million in one case as well as a reduced cost of $14.7 million which was being developed in parallel with the work comparing scenarios.

Basically the same escalation rates were used as given in 8.1 above. The only modification made was to use a discount rate (where applicable) of 15%. The reason for this change is that using a discount rate higher than the interest rate represents a "financial contingency" for parameters varying in practice differently from what had been assumed. With the consent of the B.C. Ministry the original requirement to use 17% discount rate was reduced to 15% p.a.

Variation in coal price were achieved by two methods. Firstly, by assuming reduced price of export quality coal and secondly, by a mix of full price export quality coal with free reject coal. The minimum quality mix acceptable to the boiler manufacturers of 25% export quality and 75% reject coal was used for the latter case with a resultant cost of $0.858/GJ. A secondary effect of the mix is that coal trucking quantities increase and ash disposal is increased. An increased coal trucking rate of $2.64/Te was used to allow for the increased ash trucking and disposal quantities.

The annual input used were as follows:

Using export quality coal - Exhibit 10
Using mixed coal - Exhibit 13

EXHIBIT 10

Annual Inputs for Scenario 'X'
(Export Quality Coal Only)

	A-1 Revenue ,000GJ	B-1 Oil ,000GJ	B-5 Coal ,000GJ	B-11 Aux Elec ,000$	B-12 Labour ,000$	B-13 Materials ,000$	B-14 Coal ,000Te	C-1, C-2 Capital ,000$
1982	86.9	95.0	-	24.7	309.3	33.1	0	7176
1983	168.4	-	183.4	62.2	356.2	58.7	7.40	5543
1984	211.6	-	230.7	62.2	356.2	58.7	9.31	-
1985	235.2	-	256.2	107.2	356.2	76.4	10.34	3828
1986	252.1	-	274.2	107.2	356.2	76.4	11.07	-
1987	254.5	-	276.9	107.2	356.2	76.4	11.18	-
1988	259.0	-	281.9	107.2	356.2	76.4	11.38	-
1989	263.5	-	286.9	107.2	356.2	76.4	11.58	-
1990 (& onwards)	267.9	-	291.8	107.2	356.2	76.4	11.78	-

EXHIBIT 11

Annual Inputs for Scenario 'Y'

	A-1 Revenue ,000GJ	B-1 Oil ,000GJ	B-5 Coal ,000GJ	B-11 Aux Elec ,000$	B-12 Labour ,000$	B-13 Materials ,000$	B-14 Coal ,000Te	C-1, C-2 Capital ,000$
1982	86.9	95.0	0	24.7	309.3	33.1	0	7176
1983	168.4	23.0	160.4	62.2	356.2	58.7	6.48	5543
1984	211.6	20.2	210.5	62.2	356.2	58.7	8.50	-
1985	235.2	11.2	245.0	107.2	356.2	76.4	9.89	3828
1986	252.1	11.2	263.2	107.2	356.2	76.4	10.62	-
1987	254.5	11.1	265.8	107.2	356.2	76.4	10.73	-
1988	259.0	11.3	270.6	107.2	356.2	76.4	10.92	-
1989	263.5	17.2	269.7	107.2	356.2	76.4	10.89	-
1990	267.9	17.5	274.3	107.2	356.2	76.4	11.07	-
(& onwards)								

EXHIBIT 12

Annual Inputs for Scenario 'Z'

	A-1 Revenue ,000GJ	B-1 Oil ,000GJ	B-5 Coal ,000GJ	B-11 Aux Elec ,000$	B-12 Labour ,000$	B-13 Materials ,000$	B-14 Coal ,000Te	C-1, C-2 Capital ,000$
1982	43.5	47.5	-	12.4	150.0	1.53	-	1934
1983	168.4	-	183.4	62.2	356.2	58.7	7.40	10786
1984	211.6	-	230.7	62.2	356.2	58.7	9.31	-
1985	235.2	-	256.2	107.2	356.2	76.4	10.34	3827
1986	252.1	-	274.2	107.2	356.2	76.4	11.07	-
1987	254.5	-	276.9	107.2	356.2	76.4	11.18	-
1988	259.0	-	281.9	107.2	356.2	76.4	11.38	-
1989	263.5	-	286.9	107.2	356.2	76.4	11.58	-
1990 (& onwards)	267.9	-	291.8	107.2	356.2	76.4	11.78	-

EXHIBIT 13

Annual Inputs for Scenario 'X'
(Mix of Coal)

	A-1 Revenue ,000GJ	B-1 Oil ,000GJ	B-5 Coal ,000GJ	B-11 Aux Elec ,000$	B-12 Labour ,000$	B-13 Materials ,000$	B-14 Coal ,000Te	C-1, C-2 Capital ,000$
1982	86.9	95.0	-	24.7	459.3	33.1	0	7176
1983	168.4	-	183.4	62.2	506.2	58.7	15.56	5543
1984	211.6	-	230.7	62.2	506.2	58.7	19.59	-
1985	235.2	-	256.2	107.2	506.2	76.4	21.74	3828
1986	252.1	-	274.2	107.2	506.2	76.4	23.27	-
1987	254.5	-	276.9	107.2	506.2	76.4	23.50	-
1988	259.0	-	281.9	107.2	506.2	76.4	23.93	-
1989	263.5	-	286.9	107.2	506.2	76.4	24.35	-
1990	267.9	-	291.8	107.2	506.2	76.4	24.77	-
(& onwards)								

CHAPTER 9

RESULTS

9. RESULTS

9.1 Evaluation of Scenarios 'X', 'Y' and 'Z'

Computer calculations determined the net present worth (NPW) for each applicable case with 100% and 50% energy selling price. By interpolation the energy selling price for zero NPW was derived. The results were plotted on Exhibit 14 (low escalation) and Exhibit 15 (high escalation) as energy selling price vs coal price for 16 and 18% p.a. discount rates. These figures indicate Scenarios 'X' and 'Z' to be more attractive than Scenario 'Y'. However, since Scenarios 'X' and 'Z' produced almost identical results but Scenario 'Z' was based on less positive data, Scenario 'X' was chosen for further analyzes.

The above exercise was then repeated for Scenario 'X' only to produce graphs of energy selling price vs coal price for both the original capital cost $16.5 million and the modified capital cost of $14.7 million. For these calculations a discount rate of 15% was usel as previously explained. The results are given in the following figures:

$16.5 million capital cost - Exhibit 16
$14.7 million capital cost - Exhibit 17

It should be noted that Exhibit 16 and Exhibit 17 include for the case in which mixed coal is utilized.

For Exhibit 17, if it is assumed that the actual escalation will be between the "high" and "low" cases considered, coal at or lower than the $1.28/GJ price of the coal mix will produce energy at a price competitive with the $7.50/GJ for natural gas. The mixed coal, in all cases results in an energy selling price equal to, or lower than, that of natural gas.

9.2 Equity Case

Scenario 'X' using mixed coal at a price of $0.858/GJ, was analyzed assuming 40% equity to be available. This case is typical of the financing of a utility project such as natural gas supply system. Analyses for both the original and updated capital cost figures were performed but only the results for the updated capital cost of $14.7 million are given.

The results - for both the low and high escalation cases - are given in two different ways as follows:

For a selling price of heating energy at $7.50/GJ the internal rate of return would be 14.5% for the "low" escalation case and 19.1% for the "high" esclation case and

For an internal rate of return of 15% p.a. the heat energy could be sold at $7.63 GJ (low escalation case) and $6.50 (high escalation case).

Appendices C and D give the computer results for the above cases.

9.3 Subsidy Case

This case determines the amount of interest-free subsidy required to ensure that, for each year from 1986 onwards, the cash flow before financing is always greater than or equal to the interest payable. The actual method used was to calculate the sum required for each relevant year to balance the above two amounts.

The net present worth therefore required is:

$4.3 million for the low escalation case.
$3.4 million for the high escalation case.

Since interest and discount rates used are identical, the above amounts are equivalent to the subsidy required at the start of the project to meet the stated criterion.

The bases for the calculations were:

Energy selling price	$7.50/GJ
Mixed coal at price	$0.858/GJ
Coal trucking rate	$2.64/Te
Net present worth	Nil
Capital cost	$14.7 million

Appendix E gives the computer results for this case.

EXHIBIT 14

TUMBLER RIDGE DISTRICT HEATING SYSTEM

COMPARISON OF SCENARIOS

(LOW ESCALATION)

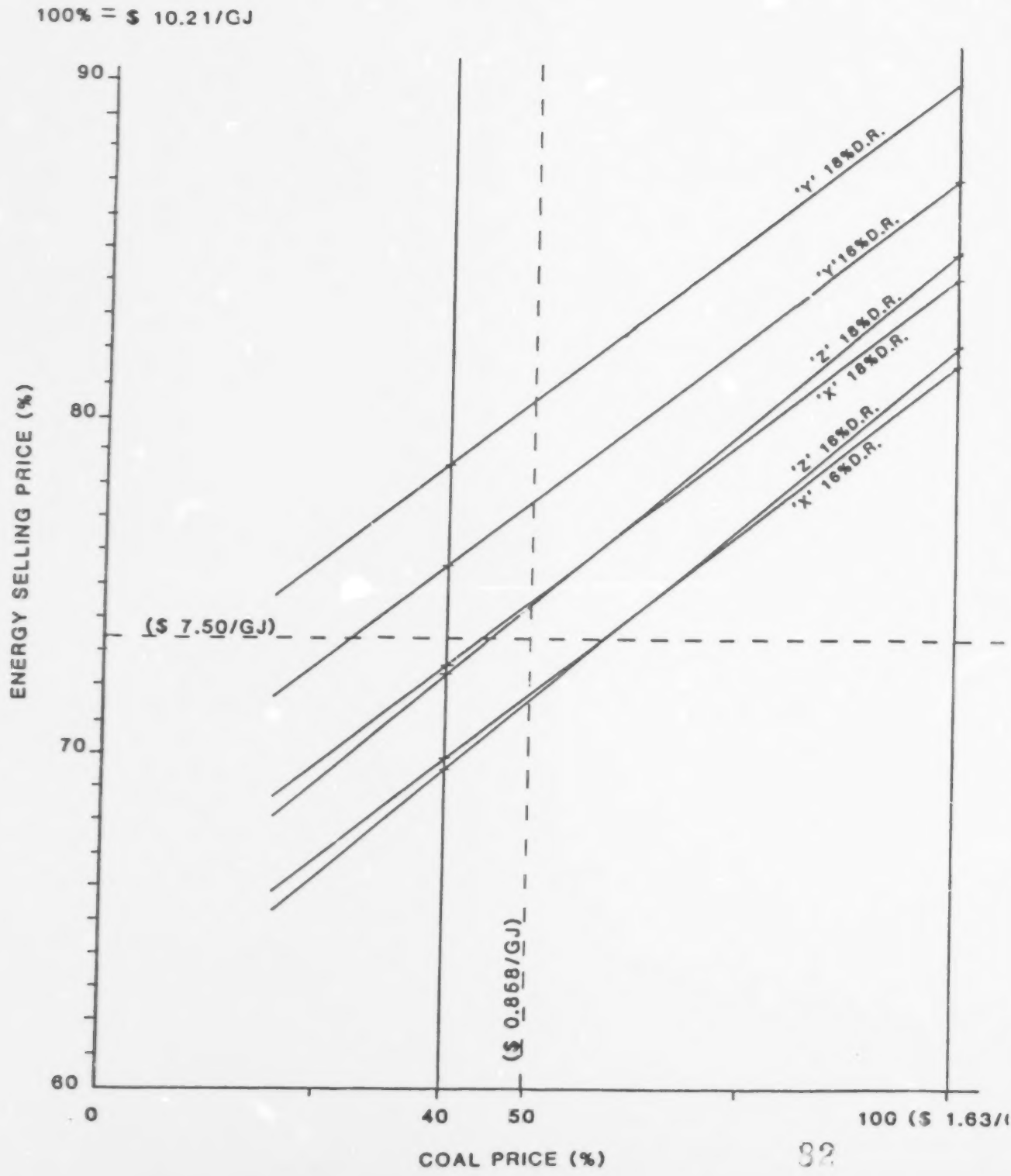


EXHIBIT 15

TUMBLER RIDGE DISTRICT HEATING SYSTEM

COMPARISON OF SCENARIOS

(HIGH ESCALATION)

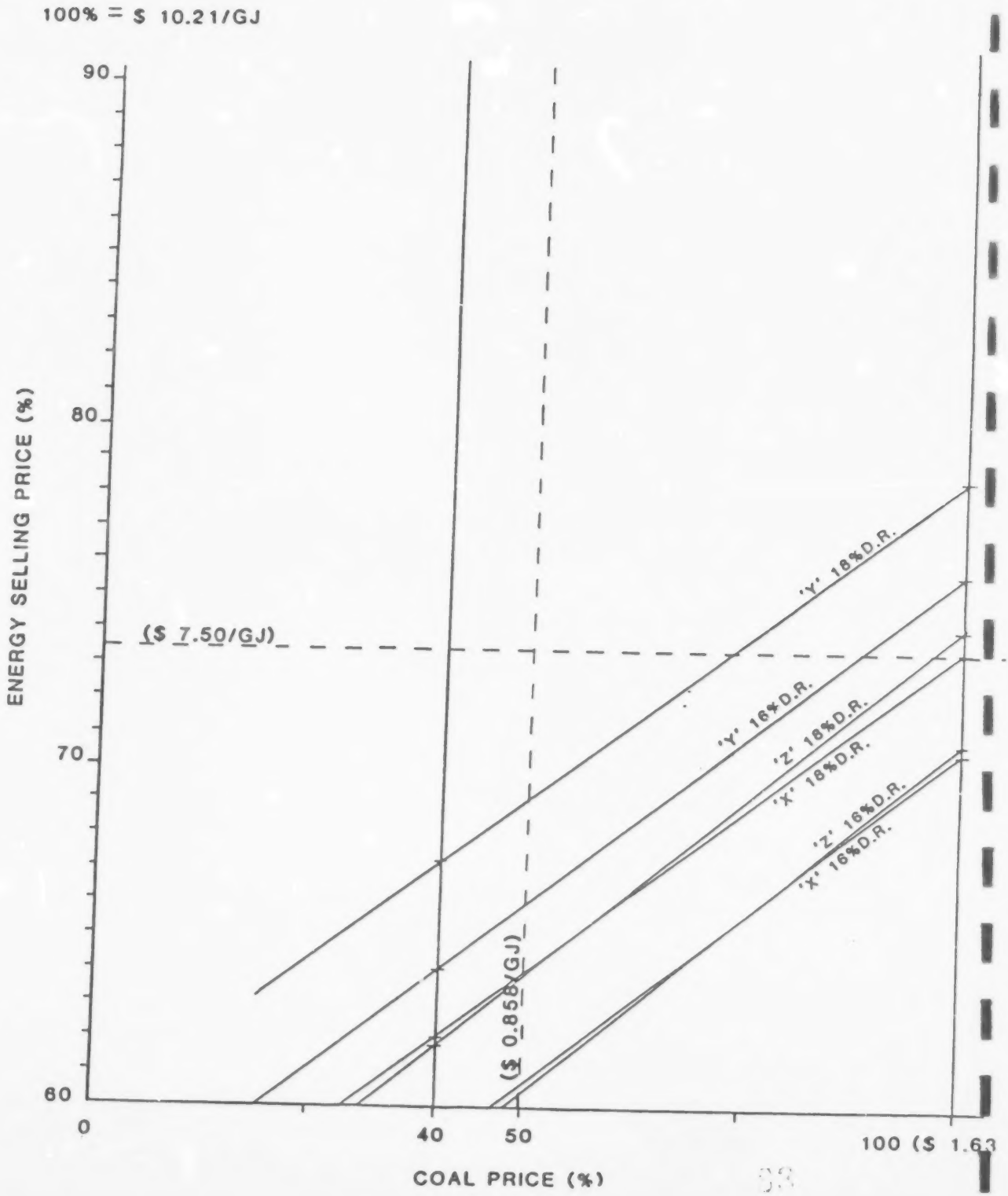


EXHIBIT 16

TUMBLER RIDGE DISTRICT HEATING SYSTEM
FINANCIAL ANALYSIS

CAPITAL COST $16.5 MILLION
INFLATION RATE 10% p.a.
INTEREST & DISCOUNT RATES 15% p.a.
ENERGY SELLING PRICE & COAL PRICE
ESCALATIONS HIGH 12% p.a. LOW 10% p.a.

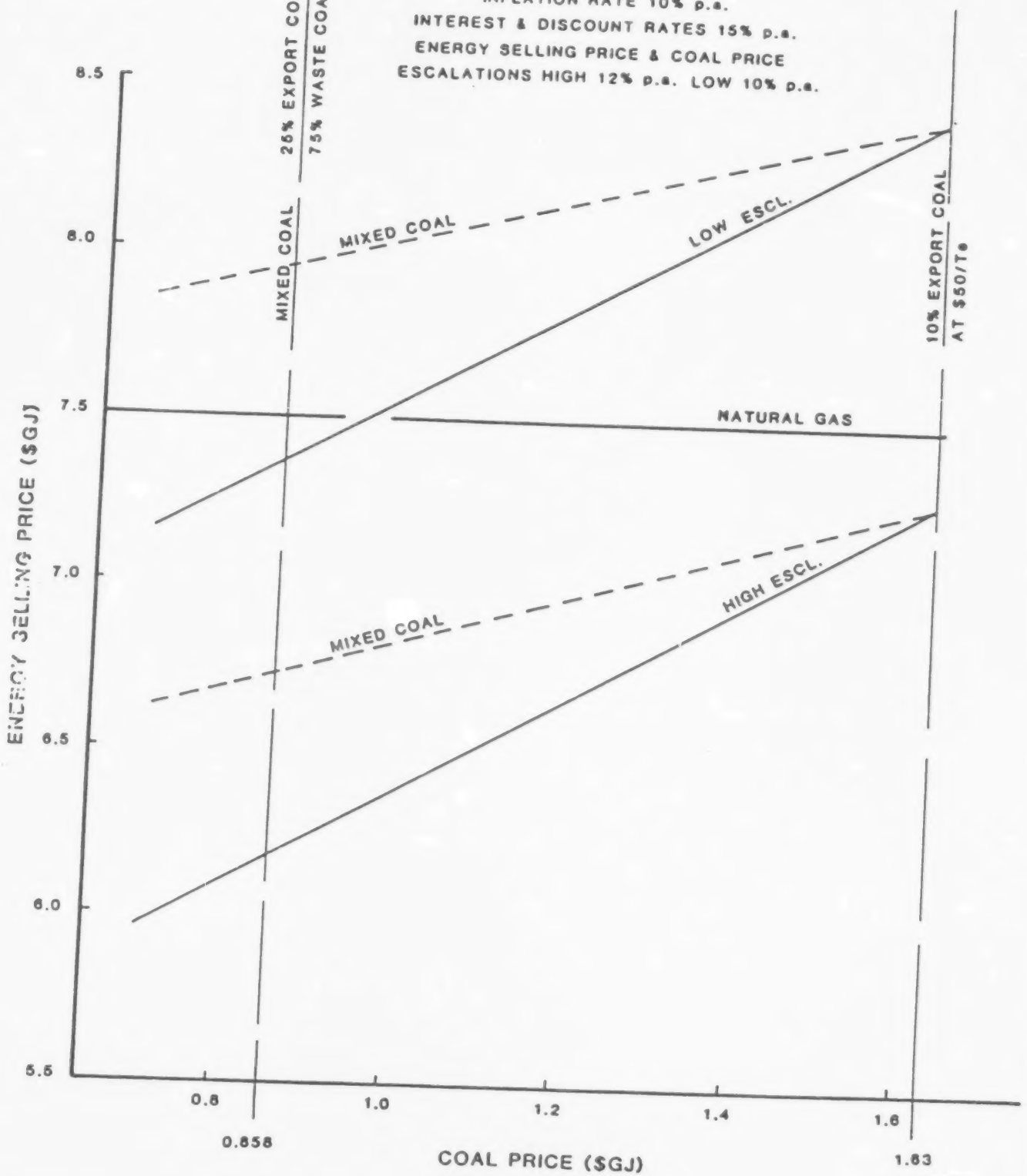


EXHIBIT 17

TUMBLER RIDGE DISTRICT HEATING SYSTEM

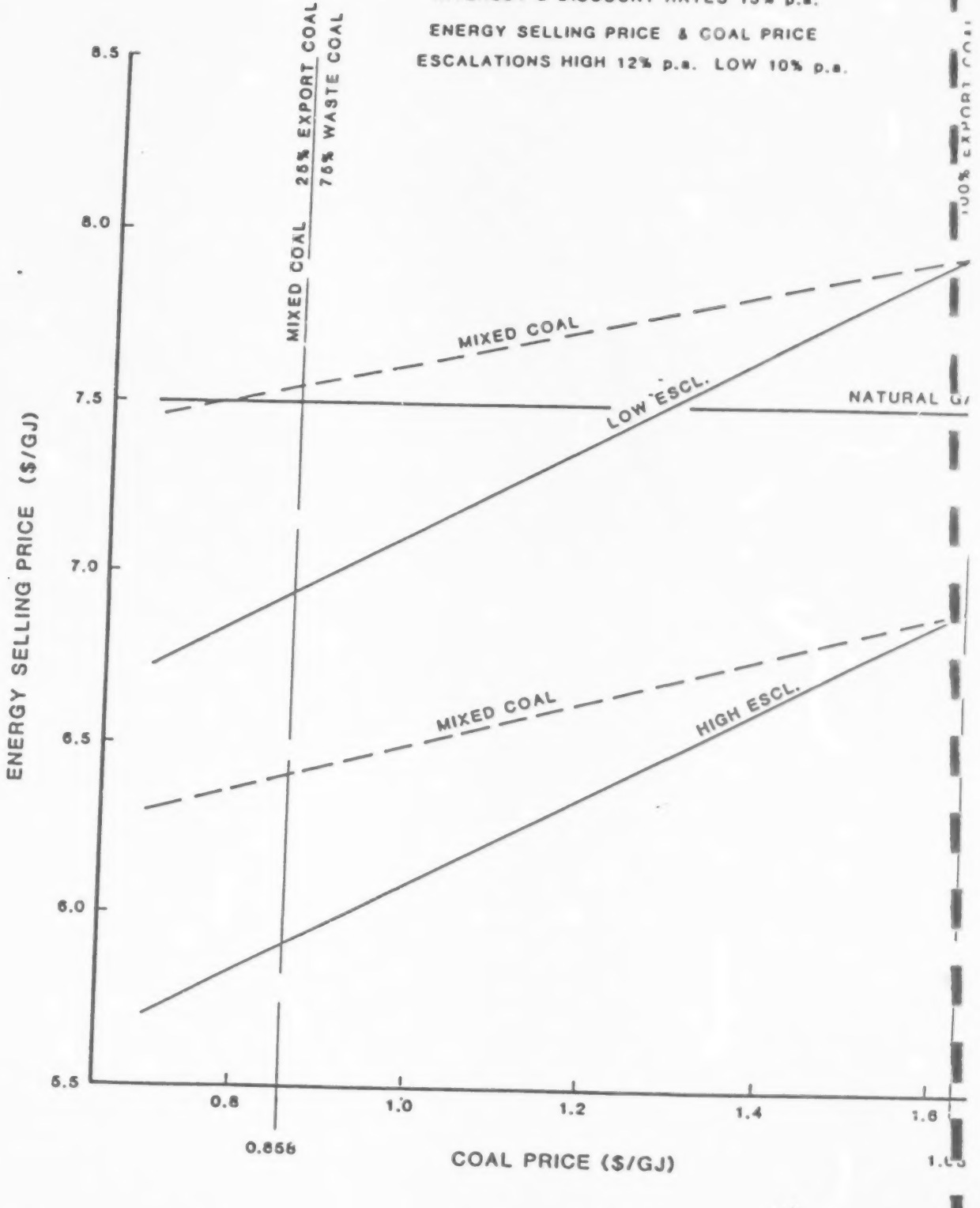
FINANCIAL ANALYSIS

CAPITAL COST = $14.7 MILLION

INFLATION RATE 10% p.a.

INTEREST & DISCOUNT RATES 15% p.a.

ENERGY SELLING PRICE & COAL PRICE ESCALATIONS HIGH 12% p.a. LOW 10% p.a.



CHAPTER 10

CONCLUSION TO PROJECT

10. CONCLUSION TO PROJECT

10.1 Submission to B.C. Government

To gain the support of the provincial government, a submission outlining the benefits, technical and financial aspects of the project was made to the Cabinet Committee on Coal Development. The District of Tumbler Ridge was willing to undertake the installation and operation of a district heating system under a separate utility, if the following recommendations were accepted:

1. The Province secure the debt incurred by the District through a guarantee. This guarantee would ensure that residents of Tumbler Ridge do not incur energy costs higher than those for electricity in order to meet the utility's interest payments; or

2. The Province make a capital contribution towards the cost of the project such that interest payments by the utility can always be met by operating revenues. The Federal government indicated probable support for 50% of such a contribution through the Canada/B.C. Energy Demonstration Agreement. This subsidy would result in low energy costs in later years or revenues which could be used for local energy projects; and

3. Quintette and Teck (the coal companies) be encouraged to supply coal to the District at the most competitive prices.

The implications of these recommendations are that a loan guarantee for a debt of up to $14.7 million (with possible inflation to a maximum of $40 million in actual dollars) or a $4 million capital subsidy made ($2 million net to the Province).

The decision for support was evaluated against possible subsidies for natural gas supply. Evaluated as a private utility with a 40% equity investment, a 14.5 to 19 percent rate of return is possible.

The economic values of the energy resources available to Tumbler Ridge are most easily evaluated in terms of opportunity cost. The opportunity costs are estimated by the Ministry of Energy, Mines and Petroleum Resources to be:

- Electricity - $16.10/GJ based on long run incremental costs of 5.5¢/kWh.
- Natural Gas - $3.40/GJ based on petrochemical netback values.
- Thermal Coal- $2.50/GJ based on export price f.o.b. port of $70/ton.

For residential space heating, private costs are currently divergent from opportunity costs, but the latter are considered to be more appropriate for government decisions.

10.2 Decision

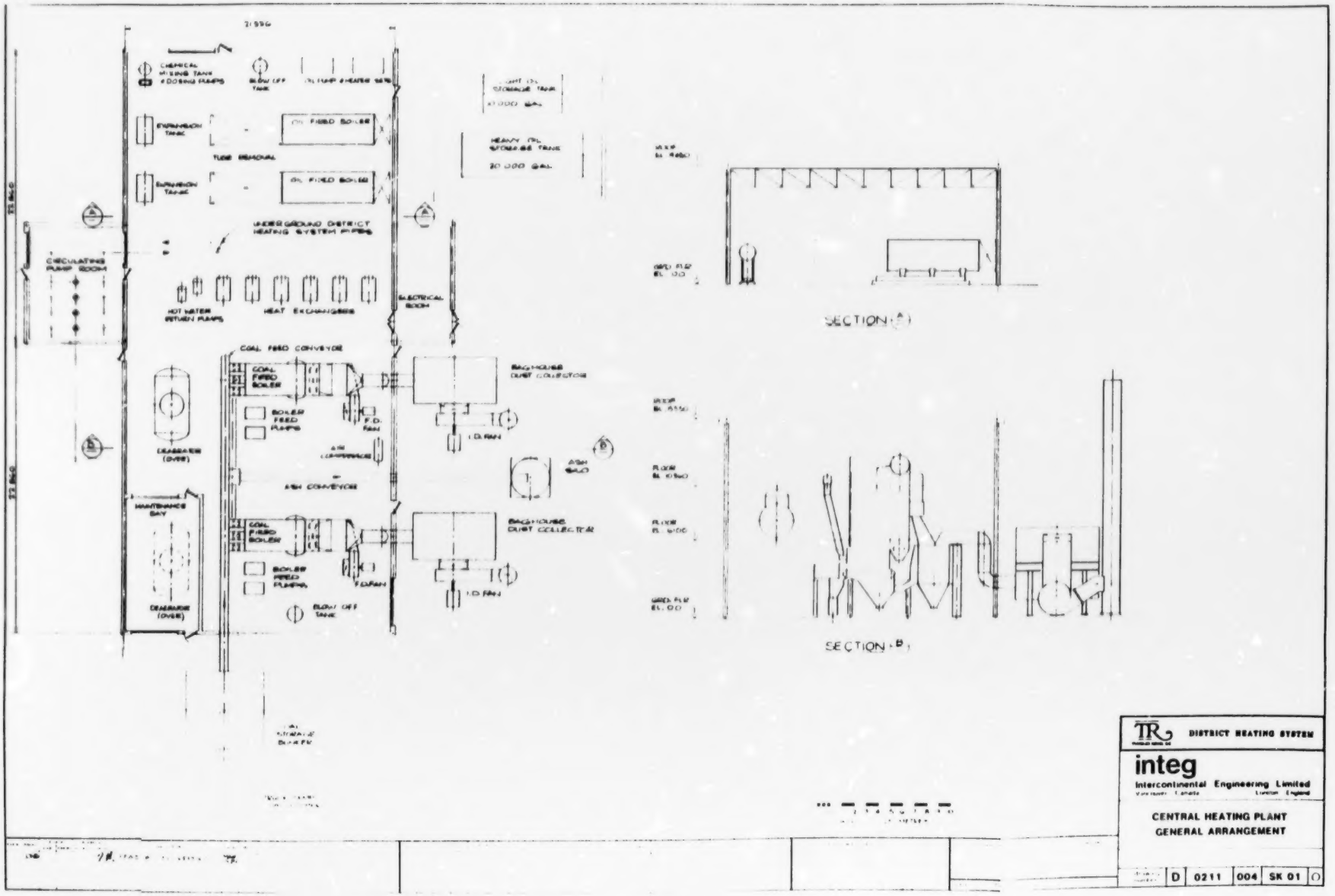
The Cabinet Committee on Coal Development rejected the recommendations in the submission stating that in a period of economic restraint, neither a loan guarantee nor a subsidy was appropriate. Without the support of the provincial government, the District of Tumbler Ridge could not proceed with the project.

Another factor contributing to the decision not to proceed with district heating was the pressure of too short a time period for constructing the system to match the schedule of building construction in the Town. Further, it became apparent that there was insufficient conviction of the benefits of district heating on the part of the District of Tumbler Ridge. This latter aspect is understandable since there are no similar installations in Canada; therefore the District did not wish to be involved in a pilot project or a demonstration installation with a high capital layout.

A natural gas supply arrangement for Tumbler Ridge was reached, although this also required some subsidy. The gas supply prices projected for residential consumers was $4.96/GJ.

APPENDIX A

LAYOUT OF PLANT AND DISTRIBUTION SYSTEM


CHEMICAL MIXING TANK & DOSING PUMPS
BLOW OFF TANK
EXPANSION TANK
OIL FIRED BOILER
TUBE REMOVAL
UNDERGROUND DISTRICT HEATING SYSTEM PIPING
CIRCULATING PUMP ROOM
HOT WATER RETURN PUMPS
HEAT EXCHANGERS
ELECTRICAL ROOM
COAL FIRED CONVEYOR
COAL FIRED BOILER
BAGHOUSE DUST COLLECTOR
BOILER FEED PUMPS
F.D. FAN
I.D.FAN
DEARATOR (OVER)
ASH CONVEYOR
ASH SILO
MAINTENANCE BAY
SECTION 'A'
SECTION 'B'
DISTRICT HEATING SYSTEM
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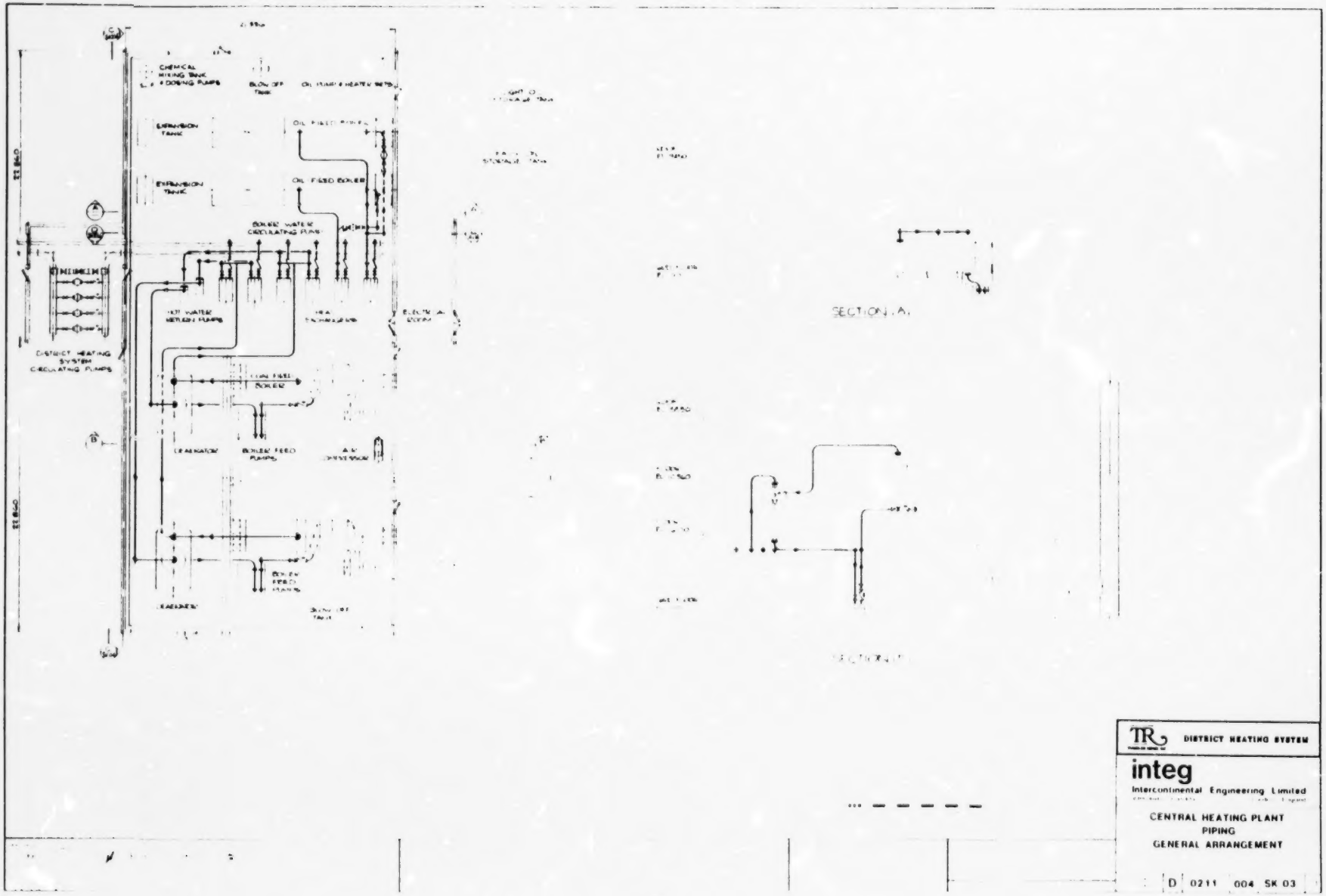
Intercontinental Engineering Limited
CENTRAL HEATING PLANT
GENERAL ARRANGEMENT
D 0211 004 SK 01 0



DISTRICT HEATING SYSTEM

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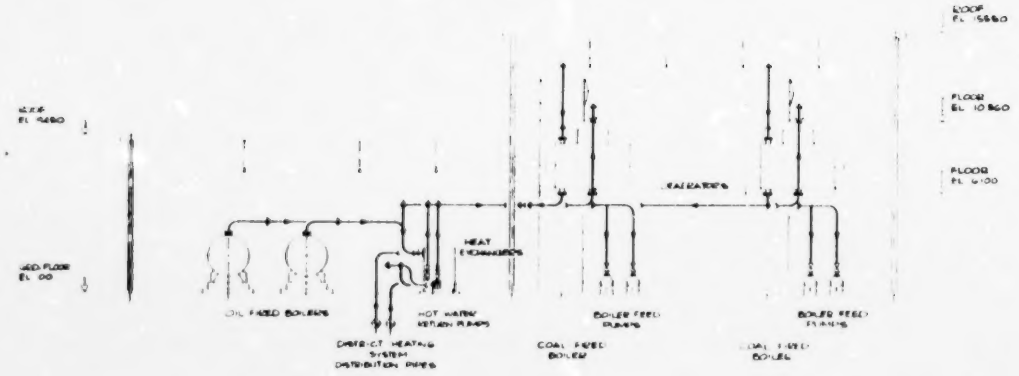
Intercontinental Engineering Limited

CENTRAL HEATING PLANT
PIPING
GENERAL ARRANGEMENT

D 0211 004 SK 03



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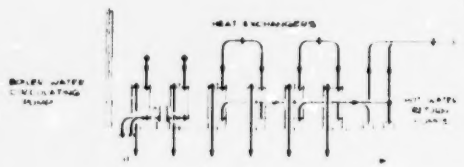

SECTION (5)

DISTRICT HEATING SYSTEM

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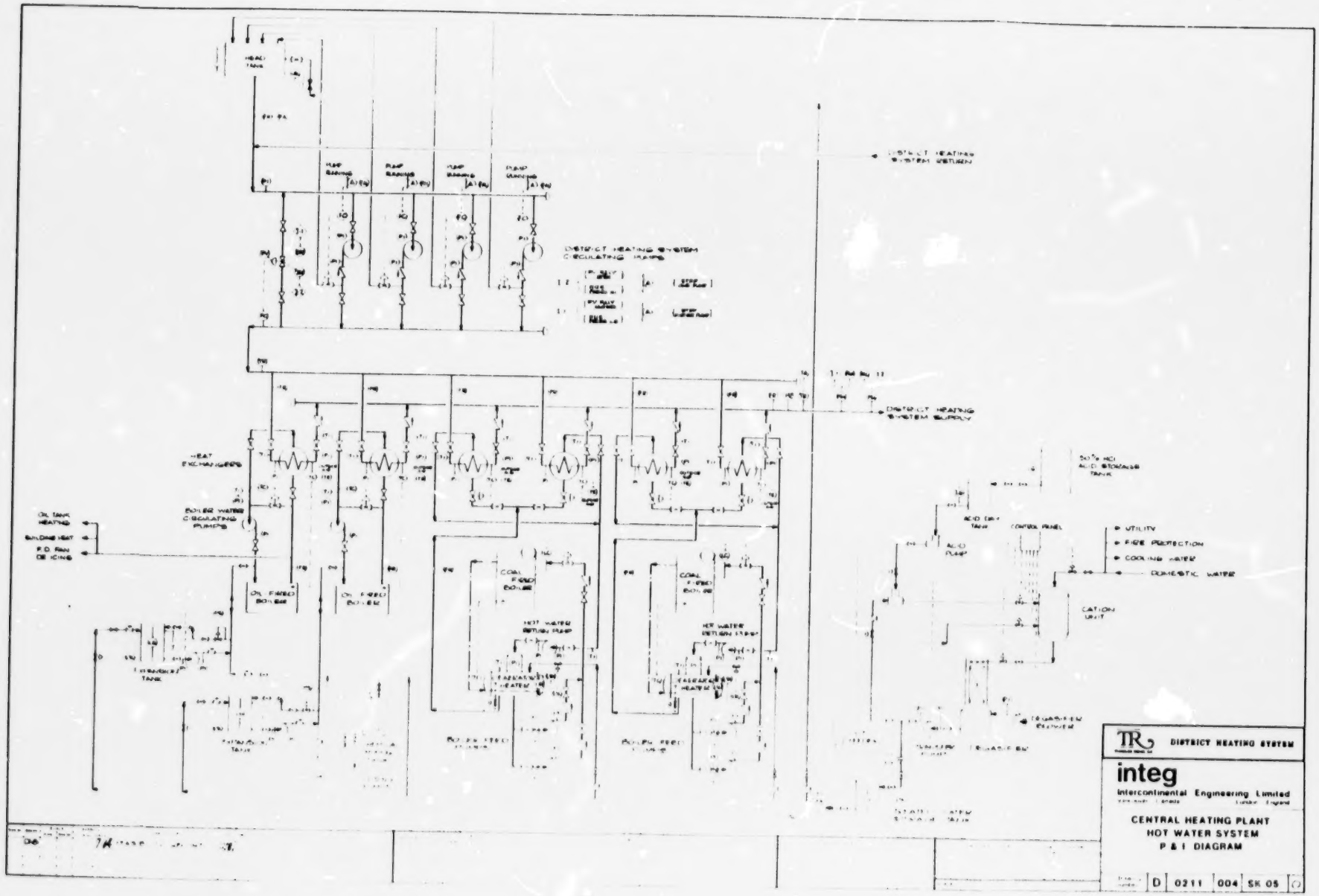
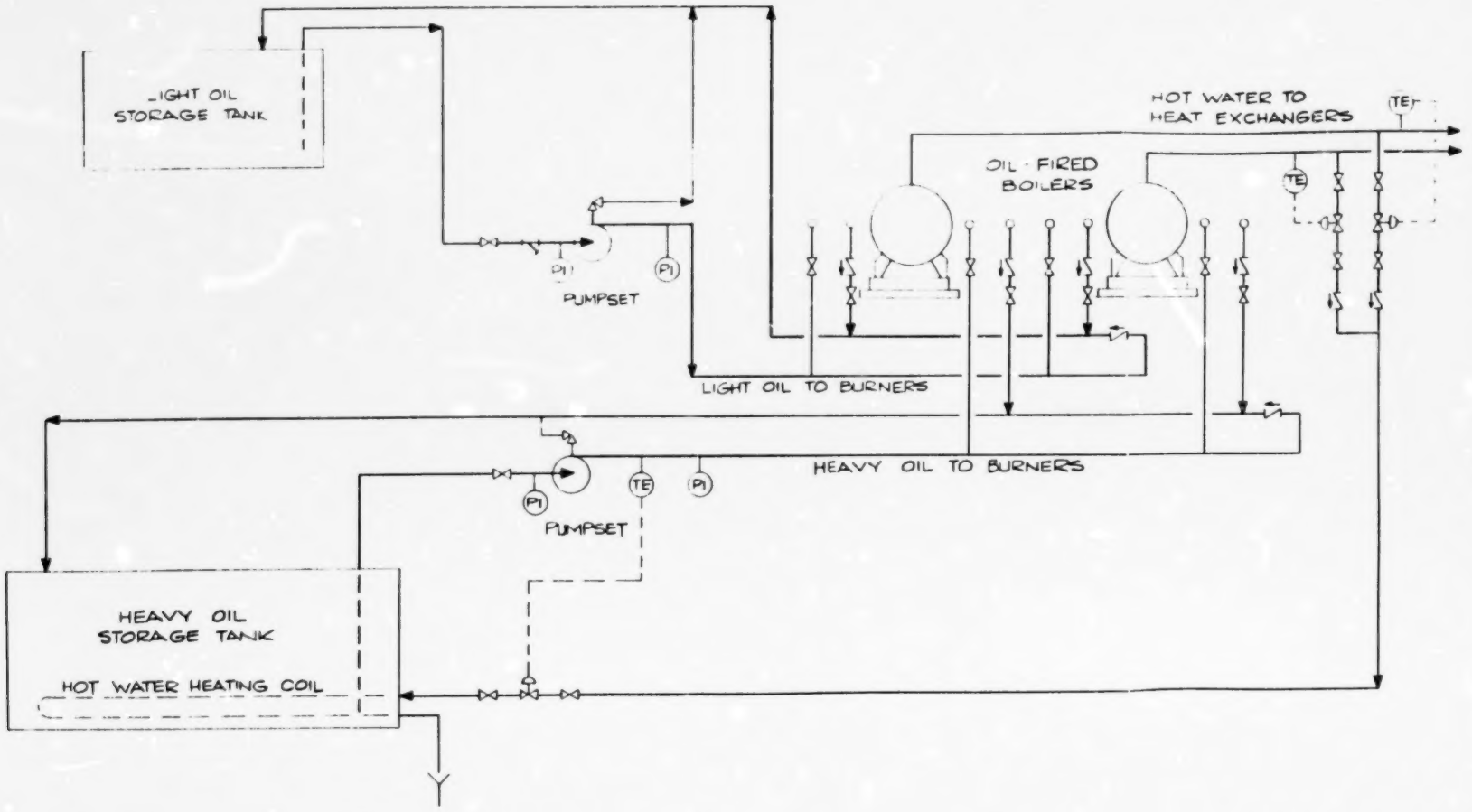
Intercontinental Engineering Limited

CENTRAL HEATING PLANT
PIPING SECTIONS

D | 0211 | 004 | SK 04


DISTRICT HEATING SYSTEM RETURN
DISTRICT HEATING SYSTEM SUPPLY
HEAT EXCHANGERS
BOILER WATER CIRCULATING PUMPS
OIL TANK HEATING
BUILDING HEAT
F.D. FAN DE ICING
OIL FIRED BOILER
COAL FIRED BOILER
HOT WATER RETURN PUMP
EXPANSION TANK
50% HCl ACID STORAGE TANK
ACID DAY TANK
CONTROL PANEL
ACID PUMP
UTILITY
FIRE PROTECTION
COOLING WATER
DOMESTIC WATER
CATION UNIT
TRANSFER RECEIVER
DISTRICT HEATING SYSTEM
integ
Intercontinental Engineering Limited
CENTRAL HEATING PLANT
HOT WATER SYSTEM
P & I DIAGRAM
D 0211 004 SK 05



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	DNB			FEASIBILITY REPORT	MAR 24/87	0

TR TUMBLER RIDGE B.C.

DISTRICT HEATING SYSTEM

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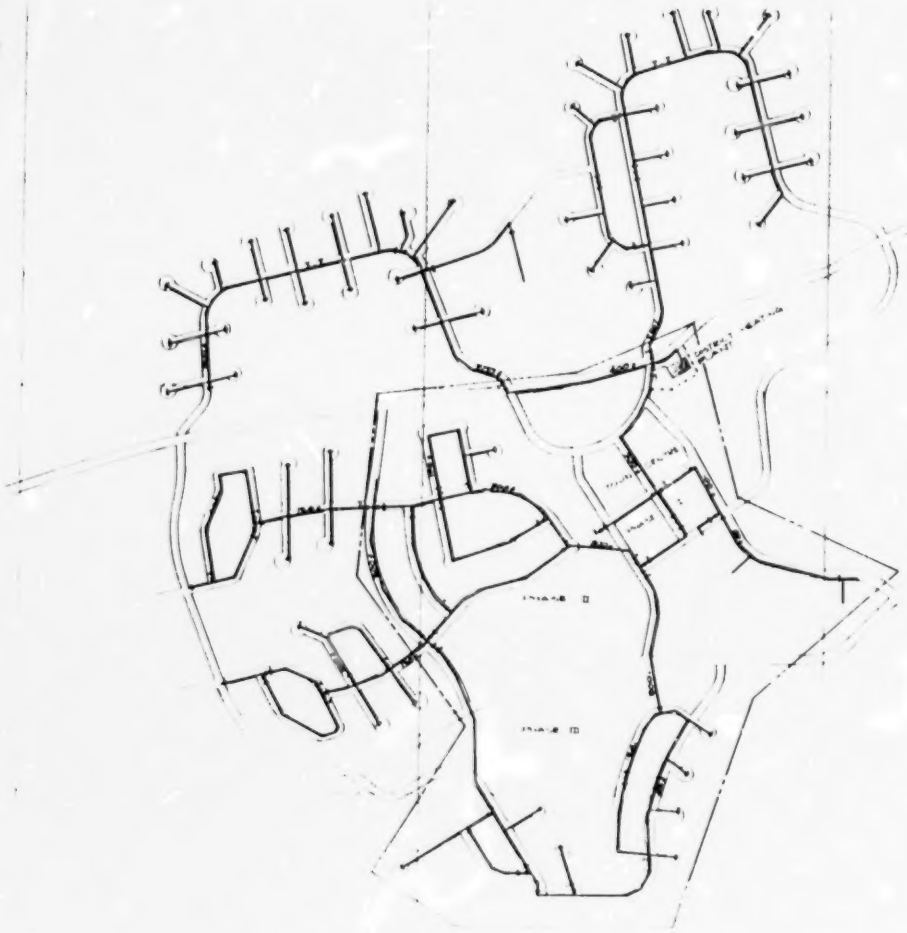
FUEL OIL SYSTEM
P & I DIAGRAM

B 0211 004 SK 06 0



NOTE.
- ISOLATING VALVE
- DRAIN VALVE
- VENT VALVE

TR DISTRICT HEATING SYSTEM

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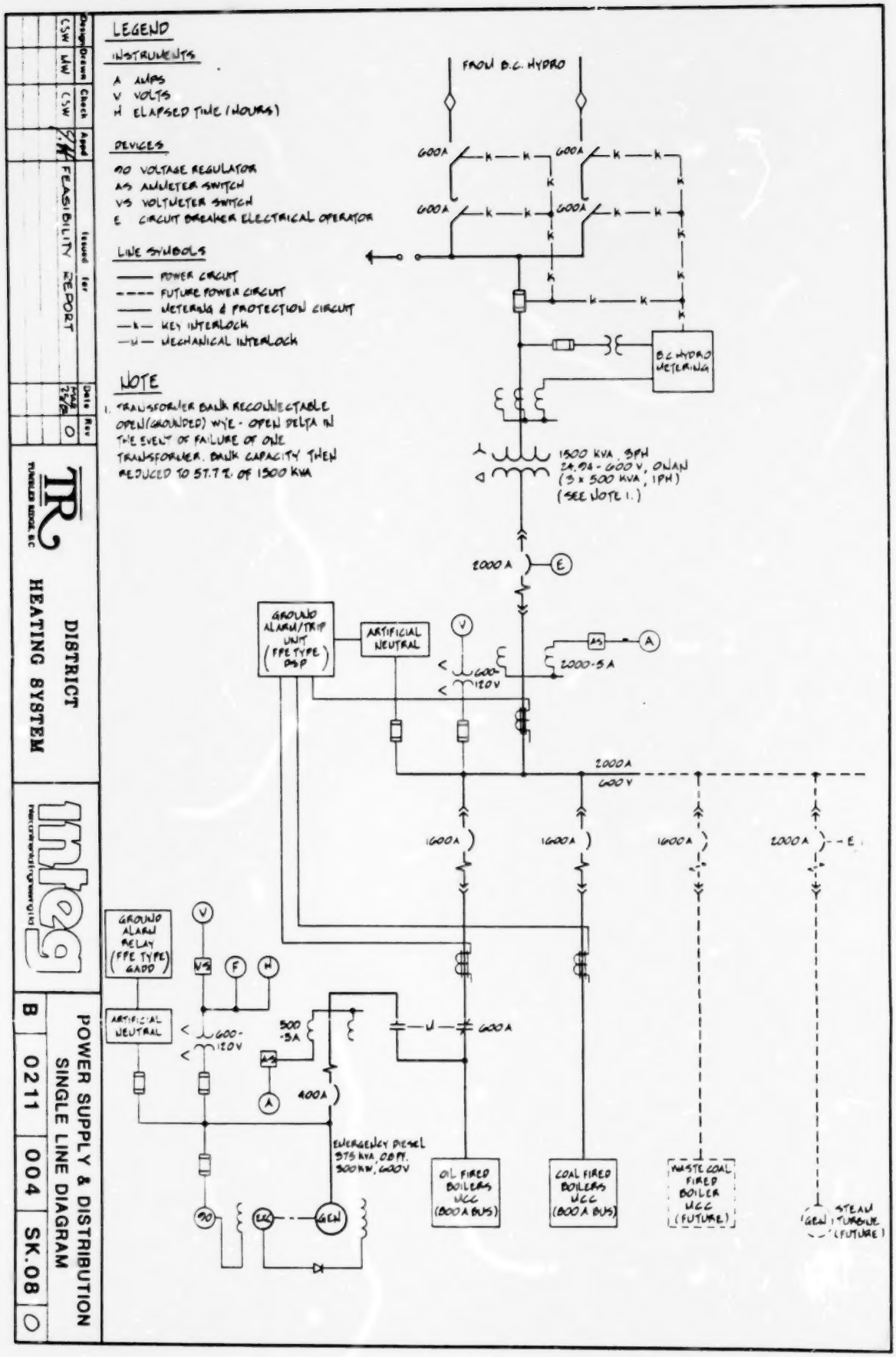
Intercontinental Engineering Limited

PROPOSED LAYOUT
OF DISTRICT HEATING
PIPING FOR STAGE 1 AND STAGE 2

D 0211 004 SK 07



	CSW	MW	CSW	S.H	FEASIBILITY REPORT
Design	Drawn	Check	Appd	Issued for	
				Date	Rev
				FEB 22/82	0

TRD TUMBLER RIDGE, B.C.

DISTRICT HEATING SYSTEM

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POWER SUPPLY & DISTRIBUTION SINGLE LINE DIAGRAM

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APPENDIX B

COSTS OF CONSUMER HEATING SYSTEM OPTIONS

A study was made comparing the installed capital costs for equipment to provide domestic hot water and space heating within residential and commercial buildings using three distinct energy sources: electricity, natural gas and district heating with low temperature hot water. The residential buildings comprised single family detached dwellings, single family attached buildings, mobile homes and apartment buildings. The town centre buildings comprise a variety of building with many diverse uses. Only one town centre building was considered for this study.

The comparative cost estimates for the space and domestic hot water heating equipment in buildings are provided in Table 1. It will be seen that the cost estimates for the three options are comparable. When the total site is considered the total cost of the equipment suitable for the district heating option is somewhat less than the other two systems. This is due to the low cost of installing such equipment in large buildings.

It should be noted that while there is a reasonable interchangeability between natural gas and district heating as energy sources, such is not the case with electric baseboard. In order to obtain this interchangeability, it would be necessary to install electric hot air furnaces or hot water heaters for space heating.

Not only does the use of district heating as a source of energy reduce the capital equipment costs for the larger buildings, but also it presents an attractive option for single family housing using hydronic baseboard. It could also provide a relatively simple method of heating factory built houses.

SUMMARY OF ESTIMATED COSTS

FOR

D.H.W. & SPACE HEATING EQUIPMENT IN BUILDINGS

FOR VARIOUS BUILDING TYPES & ENERGY SOURCES

BLDG. TYPE	ELECTRIC	NATURAL GAS WARM AIR	HYDRONIC	DISTRICT HEATING WARM AIR	DISTRICT HEATING HYDRONIC
Single family (detached)	$2,750.00	$2,462.00		$2,760,00	$1,513.00
Single family (attached)	$1,900,00	$2,375.00		$2,431.00	$1,470.00
Single family (8 unit townhouse)	$2,013.00	$2,695.00	$1,934.00	$2,042.00	$1,422.00
Apartment (25 units)	$1,398.00		$1,112.00		$ 849.00
Mobile Home	$2,287.00	$2,412.00		$2,431.00	$1,368.00
Commercial & Institutional	$2.25/sq.ft.		$1.67/sq.ft.		$0.11/sq.ft

TABLE 1

Note:

1. Townshouses, Apartments and Commercial Buildings have central D.H.W. tanks and heaters.

2. Except for the Town Centre, the above costs were estimated on the assumption that trades are non union, construction is on a volume basis, all overhead and profit and camp facilities are included. Taxes, if applicable will be extra.

APPENDIX C

SELLING PRICE FOR 15%
INTERNAL RATE OF RETURN

CASHFLOW SUMMARY (000'S)

		1 1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
REVENUE	35	632.6	1373.1	1932.3	2405.6	2887.9	3265.2	3721.7	4240.7	4828.9	5408.4	6057.4	6784.3
-COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	0.0	246.7	347.6	432.4	518.3	586.2	668.4	761.9	867.9	972.0	1088.6	1219.3
-COST OF ELECTRICITY	50	27.5	77.3	86.2	165.7	184.7	206.0	229.7	256.1	285.5	318.4	355.0	395.8
-OPERATING AND MAINTENANCE LABOU	56	509.8	623.7	692.3	768.6	853.0	946.8	1051.0	1166.6	1294.9	1437.3	1595.4	1770.9
-OPERATING AND MAINTENANCE MATER	57	36.4	71.0	78.1	111.9	123.0	135.3	148.9	163.8	180.1	198.2	218.0	239.8
-COST OF TRUCKING	55	0.0	50.6	70.7	87.1	103.5	116.0	131.2	148.1	167.3	185.7	206.1	228.8
TOTAL OPERATING EXPENDITURES	59	1425.0	1069.4	1275.0	1565.5	1782.5	1990.4	2229.0	2496.4	2795.7	3111.5	3463.1	3854.5
CASH FLOW BEFORE CAPITAL COSTS	60	-792.4	303.7	657.3	840.1	1105.3	1274.8	1492.6	1744.3	2033.2	2296.8	2594.2	2929.7
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	-7930.1	-5831.6	657.3	-4577.5	1105.3	1274.8	1492.6	1744.3	2033.2	2296.8	2594.2	2929.7
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	0.0	0.0	0.0	0.0	34.4	39.5	45.5	52.3	60.1	69.2	79.5	91.5
- INTEREST EXPENSE	69	0.0	0.0	0.0	0.0	2242.5	2237.4	2231.4	2224.6	2216.8	2207.7	2197.4	2185.4
+ OPTIONAL LOAN D/D	127	5114.9	4528.6	789.2	4517.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	356.9	1029.7	1446.5	1770.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	-3172.0	-2332.6	0.0	-1831.0	-1171.6	-1002.1	-784.3	-532.6	-243.7	19.9	317.3	652.8
ACCUMULATIVE TOTAL	71	-3172.0	-5504.7	-5504.7	-7335.7	-8507.3	-9509.4	-10293.6	-10826.3	-11070.0	-11050.0	-10732.7	-10079.9
NCF DISCOUNTED AT 13%	4	-2807.1	-1826.8	0.0	-1123.0	-635.9	-481.3	-333.4	-200.4	-81.1	5.9	82.7	150.6
NCF DISCOUNTED AT 15%	5	-2758.3	-1763.8	0.0	-1046.9	-582.5	-433.2	-294.8	-174.1	-69.3	4.9	68.2	122.0
NCF DISCOUNTED AT 17%	6	-2711.2	-1704.0	0.0	-977.1	-534.4	-390.6	-261.3	-151.7	-59.3	4.1	56.4	99.2
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	-3172.0	-2332.6	0.0	-1831.0	-1171.6	-1002.1	-784.3	-532.6	-243.7	19.9	317.3	652.8
DCF RATE OF RETURN (%)	103	15.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	5114.9	9643.5	10432.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	5114.9	4528.6	789.2	4517.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	5114.9	9643.5	10432.7	14950.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGED	129	356.9	1029.7	1446.5	1770.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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CASHFLOW SUMMARY (000'S)

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
REVENUE		35	7598.4	8510.2	9531.4	10675.2	11956.2	13390.9	14997.8	16797.6	18813.3	21070.9	23599.4	26431.3
-COST OF OIL		40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL		45	1365.6	1529.4	1713.0	1918.5	2148.8	2406.6	2695.4	3018.9	3381.1	3786.9	4241.3	4750.2
-COST OF ELECTRICITY		50	441.3	492.1	548.7	611.8	682.1	760.6	848.0	945.6	1054.3	1175.6	1310.7	1461.5
-OPERATING AND MAINTENANCE LABOU		56	1965.7	2181.9	2422.0	2688.4	2984.1	3312.3	3676.7	4081.1	4530.1	5028.4	5581.5	6195.5
-OPERATING AND MAINTENANCE MATER		57	263.8	290.1	319.1	351.1	386.2	424.8	467.3	514.0	565.4	621.9	684.1	752.5
-COST OF TRUCKING		55	253.9	281.9	312.9	347.3	385.5	427.9	475.0	527.2	585.2	649.6	721.0	800.4
TOTAL OPERATING EXPENDITURES		59	4290.3	4775.5	5315.6	5917.0	6586.6	7332.2	8162.4	9086.8	10116.1	11262.3	12538.7	13960.0
CASH FLOW BEFORE CAPITAL COSTS		60	3308.0	3734.7	4215.8	4758.1	5369.5	6058.7	6835.4	7710.8	8697.2	9808.6	11060.7	12471.3
ANALYSIS INCLUDING CONSUMER EQUIPMENT														
-CAPITAL COSTS		65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING		66	3308.0	3734.7	4215.8	4758.1	5369.5	6058.7	6835.4	7710.8	8697.2	9808.6	11060.7	12471.3
+ SCHEDULED LOAN DRAWDOWN		67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT		68	105.2	121.0	139.1	160.0	184.0	211.6	243.3	279.8	321.8	370.1	425.6	489.4
- INTEREST EXPENSE		69	2171.7	2155.9	2137.8	2116.9	2092.9	2065.3	2033.6	1997.1	1955.1	1906.8	1851.3	1787.5
+ OPTIONAL LOAN D/D		127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY		128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST		129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY		102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW		70	1031.1	1457.8	1938.8	2481.2	3092.6	3781.8	4558.5	5433.9	6420.3	7531.7	8783.8	10194.4
ACCUMULATIVE TOTAL		71	-9048.7	-7591.0	-5652.1	-3170.9	-78.3	3703.5	8262.1	13695.9	20116.2	27647.9	36431.7	46626.1
NCF DISCOUNTED AT 13%		4	210.5	263.4	310.0	351.1	387.3	419.1	447.0	471.6	493.1	511.9	528.3	542.6
NCF DISCOUNTED AT 15%		5	167.6	206.0	238.3	265.2	287.4	305.6	320.3	332.0	341.1	348.0	352.9	356.1
NCF DISCOUNTED AT 17%		6	133.9	161.8	184.0	201.2	214.4	224.1	230.8	235.2	237.5	238.1	237.4	235.5
OTHER FINANCIAL ARRANGEMENTS														
EQUITY RECOVERED (REQUIRED)		70	1031.1	1457.8	1938.8	2481.2	3092.6	3781.8	4558.5	5433.9	6420.3	7531.7	8783.8	10194.4
DCF RATE OF RETURN (%)		103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY		102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%		104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC														
OPENING BALANCE		126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN		127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT		128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE		130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES		131	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[redacted] - DEBT 60% EQUITY 40% HIGH ESC. IRR=15%

82/05/03

CASHFLOW SUMMARY (000'S)

		1	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
REVENUE	35	29603.1	33155.4	37134.1	41590.2	46581.0	52170.7	58431.2	65442.9	73296.1	82091.6	746406.7
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
-COST OF COAL	45	5320.3	5958.7	6673.7	7474.6	8371.5	9376.1	10501.3	11761.4	13172.8	14753.5	134028.7
-COST OF ELECTRICITY	50	1629.5	1816.9	2025.9	2258.9	2518.6	2808.3	3131.2	3491.3	3892.8	4340.5	40834.3
-OPERATING AND MAINTENANCE LABOU	56	6877.0	7633.4	8473.1	9405.1	10439.7	11588.1	12862.8	14277.7	15848.2	17591.5	172354.4
-OPERATING AND MAINTENANCE MATER	57	827.8	910.5	1001.6	1101.8	1211.9	1333.1	1466.4	1613.1	1774.4	1951.8	20537.3
-COST OF TRUCKING	55	888.4	986.1	1094.6	1215.0	1348.6	1497.0	1661.7	1844.4	2047.3	2272.5	22118.6
TOTAL OPERATING EXPENDITURES	59	15542.9	17305.7	19268.9	21455.4	23890.5	26602.6	29623.4	32987.9	36735.6	40909.9	390724.5
CASH FLOW BEFORE CAPITAL COSTS	60	14060.1	15949.7	17865.2	20134.8	22690.5	25568.1	28807.8	32455.0	36560.5	41181.7	355682.2
ANALYSIS INCLUDING CONSUMER EQUIPMENT												
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
CASH FLOW BEFORE FINANCING	66	14060.1	15849.7	17865.2	20134.8	22690.5	25568.1	28807.8	32455.0	36560.5	41181.7	336991.5
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	562.8	647.2	744.3	856.0	984.4	1132.0	1301.8	1497.1	1721.7	1979.9	14950.1
- INTEREST EXPENSE	69	1714.1	1629.7	1532.6	1420.9	1292.5	1144.9	975.1	779.8	555.2	297.0	53357.1
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14950.1
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4603.9
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	11783.2	13572.8	15588.2	17857.9	20413.6	23291.2	26530.9	30178.1	34283.6	38904.8	279030.5
ACCUMULATIVE TOTAL	71	58409.3	71982.1	87570.3	105428.2	125841.8	149133.0	175663.9	205842.0	240125.7	279030.5	
NCF DISCOUNTED AT 13%	4	555.0	565.8	575.0	583.0	589.7	595.4	600.2	604.2	607.4	610.0	3571.8
NCF DISCOUNTED AT 15%	5	357.9	358.5	358.1	356.7	354.6	351.8	348.4	344.6	340.5	336.0	99.7
NCF DISCOUNTED AT 17%	6	232.6	229.0	224.8	220.1	215.0	209.7	204.2	198.5	192.7	186.9	-1982.4
OTHER FINANCIAL ARRANGEMENTS												
EQUITY RECOVERED (REQUIRED)	70	11783.2	13572.8	15588.2	17857.9	20413.6	23291.2	26530.9	30178.1	34283.6	38904.8	279030.5
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.1
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC												
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25191.2
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14950.1
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40141.3
INTEREST CHARGES	131	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4603.9

WRIGHT ENGINEERS LIMITED
1444 ALBERNI STREET
VANCOUVER, B.C. V6G 2Z4

ASSUMPTIONS ABOUT INFLATION

	I	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
LABOUR													
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	14	1.110	1.232	1.368	1.518	1.685	1.870	2.076	2.305	2.558	2.839	3.152	3.498
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
TRUCKING													
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	18	1.110	1.232	1.368	1.518	1.685	1.870	2.076	2.305	2.558	2.839	3.152	3.498
ELECTRICITY													
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500
CUMULATIVE FACTOR	20	1.115	1.243	1.386	1.546	1.723	1.922	2.143	2.389	2.664	2.970	3.311	3.692
OIL													
RATE (PERCENT)	21	15.000	15.000	15.000	15.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	22	1.150	1.323	1.521	1.749	1.959	2.194	2.457	2.752	3.082	3.452	3.866	4.330
COAL													
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	24	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896
CAPITAL COSTS													
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	26	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	28	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896

REVENUE AND COST CALCULATIONS

		1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31	86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY SELLING PRICE ($/GJ)	34	7.280	8.154	9.132	10.228	11.455	12.830	14.369	16.094	18.025	20.188	22.611	25.324
TOTAL REVENUE	35	632.6	1373.1	1932.3	2405.6	2887.9	3265.2	3721.7	4240.7	4828.9	5408.4	6057.4	6784.3
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36	95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL PURCHASE PRICE ($/GJ)	39	7.347	8.449	9.717	11.174	12.515	14.017	15.699	17.583	19.693	22.056	24.703	27.667
COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL														
ENERGY PRODUCED (GJ)	41	0.0	183.4	230.7	256.2	274.2	276.9	281.9	286.9	291.8	291.8	291.8	291.8
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	0.0	229.3	288.4	320.3	342.8	346.1	352.4	358.6	364.8	364.8	364.8	364.8
COAL PURCHASE PRICE ($/GJ)	44	.961	1.076	1.205	1.350	1.512	1.694	1.897	2.124	2.379	2.665	2.985	3.343
COST OF COAL	45	0.0	246.7	347.6	432.4	518.3	586.2	668.4	761.9	867.9	972.0	1088.6	1219.3
ELECTRICITY														
COST OF ELECTRICITY	50	27.5	77.3	86.2	165.7	184.7	206.0	229.7	256.1	285.5	318.4	355.0	395.8
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
TRUCKING PRICE ($/TONNE KM)	54	2.930	3.253	3.611	4.008	4.449	4.938	5.481	6.084	6.753	7.496	8.321	9.236
COST OF TRUCKING	55	0.0	50.6	70.7	87.1	103.5	116.0	131.2	148.1	167.3	185.7	206.1	228.8
PROJECT CAPITAL COSTS														
POWER PLANT	61	7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPM	65	7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ASSUMPTIONS ABOUT INFLATION

	1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
LABOUR													
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	14	3.883	4.310	4.785	5.311	5.895	6.544	7.263	8.062	8.949	9.934	11.026	12.239
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
TRUCKING													
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	18	3.883	4.310	4.785	5.311	5.895	6.544	7.263	8.062	8.949	9.934	11.026	12.239
ELECTRICITY													
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500
CUMULATIVE FACTOR	20	4.117	4.590	5.118	5.707	6.363	7.095	7.911	8.821	9.835	10.966	12.227	13.633
OIL													
RATE (PERCENT)	21	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	22	4.850	5.432	6.084	6.814	7.632	8.548	9.573	10.722	12.009	13.450	15.064	16.871
COAL													
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	24	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179
CAPITAL COSTS													
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	26	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	28	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179

REVENUE AND COST CALCULATIONS

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY SELLING PRICE ($/GJ)	34	28.363	31.766	35.578	39.848	44.629	49.985	55.983	62.701	70.225	78.652	88.090	98.661	
TOTAL REVENUE	35	7598.4	8510.2	9531.4	10675.2	11956.2	13390.9	14997.8	16797.6	18813.3	21070.9	23599.4	26431.3	
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
OIL PURCHASE PRICE ($/GJ)	39	30.987	34.706	38.871	43.535	48.759	54.611	61.164	68.503	76.724	85.931	96.242	107.792	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
COAL														
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	
COAL PURCHASE PRICE ($/GJ)	44	3.744	4.193	4.696	5.260	5.891	6.598	7.390	8.277	9.270	10.382	11.628	13.023	
COST OF COAL	45	1365.6	1529.6	1713.0	1918.5	2148.8	2406.6	2695.4	3018.9	3381.1	3786.9	4241.3	4750.2	
ELECTRICITY														
COST OF ELECTRICITY	50	441.3	492.1	548.7	611.8	682.1	760.6	848.0	945.6	1054.3	1175.6	1310.7	1461.5	
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
TRUCKING PRICE ($/TONNE KM)	54	10.252	11.380	12.631	14.021	15.563	17.275	19.175	21.285	23.626	26.225	29.109	32.311	
COST OF TRUCKING	55	253.9	281.9	312.9	347.3	385.5	427.9	475.0	527.2	585.2	649.6	721.0	800.4	
PROJECT CAPITAL COSTS														
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL INCLUDING CONSUMER EQUIPM	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

ASSUMPTIONS ABOUT INFLATION

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
GENERAL												
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTORS	12	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
LABOUR												
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	
CUMULATIVE FACTOR	14	13.585	15.080	16.739	18.580	20.624	22.892	25.410	28.206	31.308	34.752	
MATERIALS												
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	16	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
TRUCKING												
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	
CUMULATIVE FACTOR	18	13.585	15.080	16.739	18.580	20.624	22.892	25.410	28.206	31.308	34.752	
ELECTRICITY												
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	
CUMULATIVE FACTOR	20	15.201	16.949	18.898	21.072	23.495	26.197	29.209	32.568	36.314	40.490	
OIL												
RATE (PERCENT)	21	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	22	18.896	21.164	23.703	26.548	29.733	33.301	37.297	41.773	46.786	52.400	
COAL												
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	24	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	
CAPITAL COSTS												
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	26	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	
REVENUE (ENERGY SELLING PRICE)												
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	28	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	

REVENUE AND COST CALCULATIONS

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
PROJECT REVENUE												
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY SELLING PRICE ($/GJ)	34	110.500	123.760	138.612	155.245	173.875	194.739	218.108	244.281	273.595	306.426	
TOTAL REVENUE	35	29603.1	33155.4	37134.1	41590.2	46581.0	52170.7	58431.2	65442.9	73296.1	82091.6	746406.7
PROJECT OPERATING COSTS												
OIL												
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.9
OIL PURCHASE PRICE ($/GJ)	39	120.727	135.214	151.439	169.612	189.966	212.761	238.293	266.888	298.914	334.784	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
COAL												
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	9377.0
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	11721.3
COAL PURCHASE PRICE ($/GJ)	44	14.586	16.336	18.297	20.492	22.951	25.706	29.790	32.245	36.115	40.448	
COST OF COAL	45	5320.3	5958.7	6673.7	7474.5	8371.5	9376.1	10501.3	11761.4	13172.8	14753.5	134028.7
ELECTRICITY												
COST OF ELECTRICITY	50	1629.5	1816.9	2025.9	2258.9	2518.6	2808.3	3131.2	3491.3	3892.8	4340.5	40834.3
COST OF TRUCKING												
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
TRUCKING PRICE ($/TONNE KM)	54	35.866	39.811	44.190	49.051	54.447	60.436	67.084	74.463	82.654	91.746	
COST OF TRUCKING	55	888.6	986.1	1094.5	1215.0	1348.8	1497.0	1661.7	1844.4	2047.3	2272.5	22118.8
PROJECT CAPITAL COSTS												
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7

INTEG - I.W. - DEBT 60%, EQUITY 40% LOW ESC. INFL=15%

82.03.03

CASHFLOW SUMMARY (000'S)

	I	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
REVENUE	35	729.4	1554.7	2148.9	2627.4	3097.9	3440.1	3851.0	4309.7	4819.8	5301.8	5832.0	6415.2
-COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	0.0	238.0	329.3	402.3	473.6	526.1	589.2	659.6	737.9	811.7	892.9	982.2
-COST OF ELECTRICITY	50	27.2	75.3	82.8	157.0	172.6	189.9	208.9	229.8	252.8	278.0	305.9	336.4
-OPERATING AND MAINTENANCE LABOU	56	505.2	612.5	673.8	741.1	815.2	896.8	986.4	1085.1	1193.6	1313.0	1444.2	1588.7
-OPERATING AND MAINTENANCE MATER	57	36.4	71.0	78.1	111.9	123.0	135.3	148.9	163.8	180.1	198.2	218.0	239.8
-COST OF TRUCKING	55	0.0	49.7	68.8	84.0	98.9	109.9	123.1	137.8	154.2	169.6	186.6	205.2
TOTAL OPERATING EXPENDITURES	59	1420.0	1046.5	1232.8	1496.3	1683.5	1858.0	2056.5	2276.0	2518.6	2770.5	3047.6	3352.3
CASH FLOW BEFORE CAPITAL COSTS	60	-690.7	508.2	916.1	1131.2	1414.4	1582.0	1794.5	2033.7	2301.2	2531.3	2784.4	3062.9
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	-7701.0	-5409.9	916.1	-3909.7	1414.4	1582.0	1794.5	2033.7	2301.2	2531.3	2784.4	3062.9
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	0.0	0.0	0.0	0.0	31.4	36.1	41.5	47.7	54.9	63.1	72.6	83.4
- INTEREST EXPENSE	69	0.0	0.0	0.0	0.0	2045.6	2040.9	2035.5	2029.3	2022.1	2013.9	2004.4	1993.5
+ OPTIONAL LOAN D/D	127	4967.1	4234.4	464.2	3971.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	346.5	988.5	1380.2	1625.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	-3080.4	-2164.0	0.0	-1563.9	-662.6	-494.9	-282.5	-43.3	224.2	454.3	707.5	985.9
ACCUMULATIVE TOTAL	71	-3080.4	-5244.3	-5244.3	-6808.2	-7470.8	-7965.8	-8248.3	-8291.6	-8067.3	-7613.0	-6905.5	-5919.6
NCF DISCOUNTED AT 13%	4	-2726.0	-1694.7	0.0	-959.2	-359.6	-237.7	-120.1	-16.3	74.6	133.8	184.4	227.5
NCF DISCOUNTED AT 15%	5	-2678.6	-1636.3	0.0	-894.2	-329.4	-214.0	-106.2	-14.2	63.7	112.3	152.1	184.3
NCF DISCOUNTED AT 17%	6	-2632.8	-1580.8	0.0	-834.6	-302.2	-192.9	-94.1	-12.3	54.6	94.5	125.8	149.8
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	-3080.4	-2164.0	0.0	-1563.9	-662.6	-494.9	-282.5	-43.3	224.2	454.3	707.5	985.9
DCF RATE OF RETURN (%)	103	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	4967.1	9201.6	9665.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	4967.1	4234.4	464.2	3971.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	4967.1	9201.6	9665.7	13637.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	346.5	988.5	1380.2	1625.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[redacted] 82/05/03

CASHFLOW SUMMARY (000'S)

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
REVENUE	35	7056.7	7762.4	8538.6	9392.5	10331.7	11364.9	12501.4	13751.5	15126.7	16639.3	18303.3	20133.6
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	1080.4	1188.4	1307.3	1438.0	1581.8	1740.0	1914.0	2105.4	2315.9	2547.5	2802.3	3082.5
-COST OF ELECTRICITY	50	370.1	407.1	447.8	492.6	541.8	596.0	655.6	721.2	793.3	872.6	959.9	1055.9
-OPERATING AND MAINTENANCE LABOU	56	1747.5	1922.3	2114.5	2326.0	2558.6	2814.4	3095.9	3405.5	3746.0	4120.6	4532.7	4985.9
-OPERATING AND MAINTENANCE MATER	57	263.8	290.1	319.1	351.1	386.2	424.8	467.3	514.0	565.4	621.9	684.1	752.5
-COST OF TRUCKING	55	225.8	248.3	273.2	300.5	330.5	363.6	399.9	439.9	483.9	532.3	585.5	644.1
TOTAL OPERATING EXPENDITURES	59	3687.5	4056.3	4461.9	4908.1	5398.9	5938.8	6532.7	7186.9	7904.6	8695.0	9564.5	10521.0
CASH FLOW BEFORE CAPITAL COSTS	60	3369.2	3706.1	4076.7	4484.4	4932.8	5426.1	5968.7	6565.6	7222.1	7944.3	8738.8	9612.6
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	3369.2	3706.1	4076.7	4484.4	4932.8	5426.1	5968.7	6565.6	7222.1	7944.3	8738.8	9612.6
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	96.0	110.4	126.9	145.9	167.8	193.0	222.0	255.2	293.5	337.6	388.2	446.4
- INTEREST EXPENSE	69	1981.0	1966.6	1950.1	1931.0	1909.1	1884.0	1855.0	1821.7	1783.4	1739.4	1688.8	1630.5
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	1292.2	1629.1	1999.7	2407.4	2855.8	3349.1	3891.7	4488.6	5145.1	5867.4	6661.8	7535.7
ACCUMULATIVE TOTAL	71	-4627.4	-2998.3	-998.6	1408.8	4264.6	7613.7	11505.4	15994.0	21139.2	27006.5	33668.3	41204.0
NCF DISCOUNTED AT 13%	4	263.8	294.3	319.7	340.6	357.6	371.1	381.6	389.5	395.1	398.8	400.7	401.1
NCF DISCOUNTED AT 15%	5	210.0	230.2	245.8	257.3	265.4	270.6	273.5	274.3	273.4	271.1	267.6	263.3
NCF DISCOUNTED AT 17%	6	167.8	180.9	189.8	195.2	198.0	198.4	197.1	194.3	190.3	185.5	180.0	174.0
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	1292.2	1629.1	1999.7	2407.4	2855.8	3349.1	3891.7	4488.6	5145.1	5867.4	6661.8	7535.7
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CASHFLOW SUMMARY (000'S)

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
REVENUE	35	22147.0	24361.7	26797.8	29477.6	32425.4	35667.9	39234.7	43158.2	47474.0	52221.4	547996.2
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
-COST OF COAL	45	3390.8	3729.9	4102.8	4513.1	4964.4	5460.9	6007.0	6607.7	7268.4	7995.3	83786.9
-COST OF ELECTRICITY	50	1161.5	1277.6	1405.4	1545.9	1700.5	1870.6	2057.6	2263.4	2489.7	2738.7	28741.5
-OPERATING AND MAINTENANCE LABOU	56	5484.5	6033.0	6636.3	7299.9	8029.9	8832.9	9716.2	10687.8	11756.6	12932.2	136634.7
-OPERATING AND MAINTENANCE MATER	57	827.8	910.5	1001.6	1101.8	1211.9	1333.1	1466.4	1613.1	1774.4	1951.8	20537.3
-COST OF TRUCKING	55	708.5	779.4	857.3	943.0	1037.3	1141.1	1255.2	1380.7	1518.8	1670.6	17507.4
TOTAL OPERATING EXPENDITURES	59	11573.1	12730.4	14003.4	15403.8	16944.1	18638.5	20502.4	22552.6	24807.9	27288.7	288059.0
CASH FLOW BEFORE CAPITAL COSTS	60	10573.9	11631.3	12794.4	14073.9	15481.2	17029.4	18732.3	20605.5	22666.1	24932.7	259937.2

ANALYSIS INCLUDING CONSUMER EQUIPMENT

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
CASH FLOW BEFORE FINANCING	66	10573.9	11631.3	12794.4	14073.9	15481.2	17029.4	18732.3	20605.5	22666.1	24932.7	241967.9
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	513.4	590.4	679.0	780.8	897.9	1032.6	1187.5	1365.6	1570.5	1806.1	13637.4
- INTEREST EXPENSE	69	1563.6	1486.6	1398.0	1296.2	1179.0	1044.4	889.5	711.3	506.5	270.9	48571.8
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13637.4
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4341.1
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	8496.9	9554.3	10717.4	11996.9	13404.3	14952.4	16655.3	18528.6	20589.1	22855.7	188955.0
ACCUMULATIVE TOTAL	71	49700.9	59255.2	69972.7	81969.6	95373.8	110326.2	126981.6	145510.1	166099.3	188955.0	
NCF DISCOUNTED AT 13%	4	400.2	398.3	395.3	391.6	387.2	382.3	376.8	371.0	364.8	358.4	2646.7
NCF DISCOUNTED AT 15%	5	258.1	252.4	246.2	239.6	232.8	225.8	218.7	211.6	204.5	197.4	29.0
NCF DISCOUNTED AT 17%	6	167.7	161.2	154.6	147.9	141.2	134.6	128.2	121.9	115.7	109.8	-1591.0

OTHER FINANCIAL ARRANGEMENTS

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
EQUITY RECOVERED (REQUIRED)	70	8496.9	9554.3	10717.4	11996.9	13404.3	14952.4	16655.3	18528.6	20589.1	22855.7	188955.0
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OPTIONAL LOAN D/C AND REPAY CALC

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23834.4
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13637.4
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37471.8
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4341.1

ASSUMPTIONS ABOUT INFLATION

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
LABOUR													
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	14	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
TRUCKING													
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	18	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
ELECTRICITY													
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	20	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
OIL													
RATE (PERCENT)	21	15.000	15.000	15.000	15.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	22	1.150	1.323	1.521	1.749	1.924	2.116	2.328	2.561	2.817	3.098	3.408	3.749
COAL													
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	24	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
CAPITAL COSTS													
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	26	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	28	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138

REVENUE AND COST CALCULATIONS

		1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
PROJECT REVENUE														
TOTAL HEAT CONSUMED		31	66.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY CONVERSION EFFICIENCY		32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)		33	66.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY SELLING PRICE ($/GJ)		34	8.393	9.232	10.156	11.171	12.288	13.517	14.869	16.356	17.991	19.790	21.769	23.946
TOTAL REVENUE		35	729.4	1554.7	2148.9	2627.4	3097.9	3440.1	3851.0	4309.7	4819.8	5301.8	5832.0	6415.2
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)		36	95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONVERSION EFFICIENCY		37	.82	.82	.92	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)		38	115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL PURCHASE PRICE ($/GJ)		39	7.347	8.449	9.717	11.174	12.292	13.521	14.873	16.360	17.996	19.796	21.776	23.953
COST OF OIL		40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL														
ENERGY PRODUCED (GJ)		41	0.0	183.4	230.7	256.2	274.2	276.9	281.9	286.9	291.8	291.8	291.8	291.8
CONVERSION EFFICIENCY		42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)		43	0.0	229.3	288.4	320.3	342.8	346.1	352.4	358.6	364.8	364.8	364.8	364.8
COAL PURCHASE PRICE ($/GJ)		44	.944	1.038	1.142	1.256	1.382	1.520	1.672	1.839	2.023	2.225	2.448	2.693
COST OF COAL		45	0.0	238.0	329.3	402.3	473.6	526.1	589.2	659.6	737.9	811.7	892.9	982.2
ELECTRICITY														
COST OF ELECTRICITY		50	27.2	75.3	82.8	157.0	172.6	189.9	208.9	229.8	252.8	278.0	305.9	336.4
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS		51	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
ROUND TRIP DISTANCE (KM)		52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS		53	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
TRUCKING PRICE ($/TONNE KM)		54	2.904	3.194	3.514	3.865	4.252	4.677	5.145	5.659	6.225	6.847	7.532	8.285
COST OF TRUCKING		55	0.0	49.7	68.8	84.0	98.9	109.9	123.1	137.8	154.2	169.6	186.6	205.2
PROJECT CAPITAL COSTS														
POWER PLANT		61	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISTRIBUTION SYSTEM AND INITAIL		62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME		63	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSUMER EQUIPMENT		64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPM		65	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ASSUMPTIONS ABOUT INFLATION

	1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
LABOUR													
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	14	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
TRUCKING													
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	18	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
ELECTRICITY													
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	20	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
OIL													
RATE (PERCENT)	21	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	22	4.124	4.536	4.990	5.489	6.038	6.642	7.306	8.037	8.840	9.724	10.697	11.766
COAL													
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	24	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
CAPITAL COSTS													
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	26	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	28	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850

REVENUE AND COST CALCULATIONS

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY SELLING PRICE ($/GJ)	34	26.341	28.975	31.872	35.060	38.566	42.422	46.664	51.331	56.464	62.110	68.321	75.153	
TOTAL REVENUE	35	7056.7	7762.4	8538.6	9392.5	10331.7	11364.9	12501.4	13751.5	15126.7	16639.3	18303.3	20133.6	
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
OIL PURCHASE PRICE ($/GJ)	39	26.349	28.984	31.882	35.070	38.577	42.435	46.679	51.346	56.481	62.129	68.342	75.176	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
COAL														
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	
COAL PURCHASE PRICE ($/GJ)	44	2.962	3.258	3.584	3.942	4.337	4.770	5.247	5.772	6.349	6.984	7.683	8.451	
COST OF COAL	45	1080.4	1188.4	1307.3	1438.0	1581.8	1740.0	1914.0	2105.4	2315.9	2547.5	2802.3	3082.5	
ELECTRICITY														
COST OF ELECTRICITY	50													
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
TRUCKING PRICE ($/TONNE KM)	54	9.114	10.025	11.028	12.131	13.344	14.678	16.146	17.761	19.537	21.490	23.639	26.003	
COST OF TRUCKING	55	225.8	248.3	273.2	300.5	330.5	363.6	399.9	439.9	483.9	532.3	585.5	644.1	
PROJECT CAPITAL COSTS														
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

ASSUMPTIONS ABOUT INFLATION

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
GENERAL												
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTORS	12	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
LABOUR												
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	14	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
MATERIALS												
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	16	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
TRUCKING												
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	18	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
ELECTRICITY												
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	20	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
OIL												
RATE (PERCENT)	21	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	22	12.943	14.237	15.661	17.227	18.950	20.845	22.929	25.222	27.745	30.519	
COAL												
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	24	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
CAPITAL COSTS												
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	26	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
REVENUE (ENERGY SELLING PRICE)												
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	28	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	

INTEG - T.R. - DEBT 60%, EQUITY 40% LOW ESC. IRR=15%

02/05/03

REVENUE AND COST CALCULATIONS

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
PROJECT REVENUE												
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY SELLING PRICE ($/GJ)	34	82.669	90.936	100.029	110.032	121.035	133.139	146.453	161.098	177.208	194.929	
TOTAL REVENUE	35	22147.0	24361.7	26797.8	29477.6	32425.4	35667.9	39234.7	43158.2	47474.0	52221.4	547996.2
PROJECT OPERATING COSTS												
OIL												
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.9
OIL PURCHASE PRICE ($/GJ)	39	82.693	90.963	100.059	110.065	121.071	133.178	146.496	161.146	177.261	194.987	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
COAL												
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	9377.0
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	11721.3
COAL PURCHASE PRICE ($/GJ)	44	9.296	10.226	11.248	12.373	13.611	14.972	16.469	18.116	19.927	21.920	
COST OF COAL	45	3390.8	3729.9	4102.8	4513.1	4964.4	5460.9	6007.0	6607.7	7268.4	7995.3	83786.9
ELECTRICITY												
COST OF ELECTRICITY	50	1161.5	1277.6	1405.4	1545.9	1700.5	1870.6	2057.6	2263.4	2489.7	2738.7	28741.5
COST OF TRUCKING												
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
TRUCKING PRICE ($/TONNE KM)	54	28.604	31.464	34.610	38.071	41.879	46.066	50.673	55.740	61.314	67.446	
COST OF TRUCKING	55	708.5	779.4	857.3	943.0	1037.3	1141.1	1255.2	1380.7	1518.8	1670.6	17507.4
PROJECT CAPITAL COSTS												
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPM	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3

APPENDIX D

INTERNAL RATE OF RETURN FOR ENERGY SELLING PRICE OF $7.50/GJ

EG ... T EC EQUI 0% ESC T. TAL [redacted] 8 '30

CASHFLOW SUMMARY (000'S)

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
REVENUE	35	730.0	1594.3	2229.6	2775.7	3332.1	3767.5	4294.2	4893.1	5571.8	6240.4	6989.3	7828.0
-COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	0.0	246.7	347.6	432.4	518.3	586.2	668.4	761.9	867.9	972.0	1088.6	1219.3
-COST OF ELECTRICITY	50	27.5	77.3	86.2	165.7	184.7	206.0	229.7	256.1	285.5	318.4	355.0	395.8
-OPERATING AND MAINTENANCE LABOU	56	509.8	623.7	692.3	768.4	853.0	946.8	1051.0	1166.6	1294.9	1437.3	1595.4	1770.9
-OPERATING AND MAINTENANCE MATER	57	36.4	71.0	78.1	111.9	123.0	135.3	148.9	163.8	180.1	198.2	218.0	239.8
-COST OF TRUCKING	55	0.0	50.6	70.7	87.1	103.5	116.0	131.2	148.1	167.3	185.7	206.1	228.8
TOTAL OPERATING EXPENDITURES	59	1425.0	1069.4	1275.0	1565.5	1782.5	1990.4	2229.0	2496.4	2795.7	3111.5	3463.1	3854.5
CASH FLOW BEFORE CAPITAL COSTS	60	-695.0	514.9	954.6	1210.2	1549.6	1777.2	2065.2	2396.7	2776.1	3128.9	3526.2	3973.4

ANALYSIS INCLUDING CONSUMER EQUIPMENT

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
-CAPITAL COSTS	65	7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	-7832.8	-5620.4	954.6	-4207.4	1549.6	1777.2	2065.2	2396.7	2776.1	3128.9	3526.2	3973.4
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	0.0	0.0	0.0	0.0	32.4	37.3	42.9	49.3	56.7	65.2	75.0	86.2
- INTEREST EXPENSE	69	0.0	0.0	0.0	0.0	2114.1	2109.2	2103.6	2097.2	2089.8	2081.3	2071.5	2060.3
+ OPTIONAL LOAN D/D	127	5052.2	4383.0	460.6	4198.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	352.5	1010.7	1415.3	1673.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	-3133.1	-2248.1	0.0	-1683.0	-596.9	-369.3	-81.3	250.2	629.6	982.4	1379.7	1826.9
ACCUMULATIVE TOTAL	71	-3133.1	-5381.3	-5381.3	-7064.2	-7661.1	-8030.5	-8111.8	-7861.6	-7231.9	-6249.5	-4869.9	-3043.0
NCF DISCOUNTED AT 13%	4	-2772.7	-1760.6	0.0	-1032.2	-324.0	-177.4	-34.6	94.1	209.6	289.4	359.7	421.5
NCF DISCOUNTED AT 15%	5	-2724.4	-1699.9	0.0	-962.2	-296.8	-159.7	-30.6	81.8	179.0	242.8	296.5	341.5
NCF DISCOUNTED AT 17%	6	-2677.9	-1642.3	0.0	-898.1	-272.3	-144.0	-27.1	71.3	153.3	204.4	245.3	277.6

OTHER FINANCIAL ARRANGEMENTS

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EQUITY RECOVERED (REQUIRED)	70	-3133.1	-2248.1	0.0	-1683.0	-596.9	-369.3	-81.3	250.2	629.6	982.4	1379.7	1826.9
DCF RATE OF RETURN (%)	103	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OPTIONAL LOAN D/D AND REPAY CALC

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
OPENING BALANCE	126	0.0	5052.2	9435.1	9895.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	5052.2	4383.0	460.6	4198.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	5052.2	9435.1	9895.7	14093.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	352.5	1010.7	1415.3	1673.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CASHFLOW SUMMARY (000'S)

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
REVENUE	35	8767.3	9819.4	10997.8	12317.5	13795.6	15451.1	17305.2	19381.8	21707.6	24312.5	27230.1	30497.7
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	1365.6	1529.4	1713.0	1918.5	2148.8	2406.6	2695.4	3018.9	3381.1	3786.9	4241.3	4750.2
-COST OF ELECTRICITY	50	441.3	492.1	548.7	611.8	682.1	760.6	848.0	945.6	1054.3	1175.6	1310.7	1461.5
-OPERATING AND MAINTENANCE LABOU	56	1965.7	2181.9	2422.0	2688.4	2984.1	3312.3	3676.7	4081.1	4530.1	5028.4	5581.5	6195.5
-OPERATING AND MAINTENANCE MATER	57	263.8	290.1	319.1	351.1	386.2	424.8	467.3	514.0	565.4	621.9	684.1	752.5
-COST OF TRUCKING	55	253.9	281.9	312.9	347.3	385.5	427.9	475.0	527.2	585.2	649.6	721.0	800.4
TOTAL OPERATING EXPENDITURES	59	4290.3	4775.5	5315.6	5917.0	6586.6	7332.2	8162.4	9086.8	10116.1	11262.3	12538.7	13960.0
CASH FLOW BEFORE CAPITAL COSTS	60	4477.0	5043.9	5682.1	6400.5	7208.9	8118.8	9142.8	10295.0	11591.5	13050.3	14691.4	16537.6
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	4477.0	5043.9	5682.1	6400.5	7208.9	8118.8	9142.8	10295.0	11591.5	13050.3	14691.4	16537.6
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	99.2	114.0	131.2	150.8	173.4	199.5	229.4	263.8	303.4	348.9	401.2	461.4
- INTEREST EXPENSE	69	2047.3	2032.5	2015.4	1995.7	1973.1	1947.0	1917.1	1882.7	1843.1	1797.6	1745.3	1685.1
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	2330.5	2897.4	3535.6	4253.9	5062.4	5972.3	6996.3	8148.5	9445.0	10903.8	12544.9	14391.1
ACCUMULATIVE TOTAL	71	-712.4	2185.0	5720.6	9974.6	15037.0	21009.4	28005.7	36154.2	45599.3	56503.0	69047.9	83439.0
NCF DISCOUNTED AT 13%	4	475.8	523.5	565.3	601.9	633.9	661.8	686.1	707.1	725.4	741.1	754.5	766.0
NCF DISCOUNTED AT 15%	5	378.8	409.5	434.5	454.6	470.4	482.6	491.6	497.9	501.8	503.8	504.0	502.7
NCF DISCOUNTED AT 17%	6	302.7	321.7	335.5	345.0	350.9	353.8	354.3	352.7	349.4	344.7	339.0	332.4
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	2330.5	2897.4	3535.6	4253.9	5062.4	5972.3	6996.3	8148.5	9445.0	10903.8	12544.9	14391.1
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CASHFLOW SUMMARY (000'S)

		1 2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
REVENUE	35	34157.4	38256.3	42847.0	47988.7	53747.3	60197.0	67420.6	75511.1	84572.4	94721.1	861238.5
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
-COST OF COAL	45	5320.3	5958.7	6673.7	7474.6	8371.5	9376.1	10501.3	11761.4	13172.8	14753.5	134028.7
-COST OF ELECTRICITY	50	1629.5	1816.9	2025.9	2258.9	2518.6	2808.3	3131.2	3491.3	3892.8	4340.5	40834.3
-OPERATING AND MAINTENANCE LABOU	56	6817.0	7633.4	8473.1	9405.1	10439.7	11588.1	12862.8	14277.7	15848.2	17591.5	172354.4
-OPERATING AND MAINTENANCE MATER	57	827.8	910.5	1001.6	1101.8	1211.9	1333.1	1466.4	1613.1	1774.4	1951.8	20537.3
-COST OF TRUCKING	55	888.4	986.1	1094.6	1215.0	1348.6	1497.0	1661.7	1844.4	2047.3	2272.5	22118.6
TOTAL OPERATING EXPENDITURES	59	15542.9	17305.7	19268.9	21455.4	23890.5	26602.6	29623.4	32987.9	36735.6	40909.9	390724.5
CASH FLOW BEFORE CAPITAL COSTS	60	18614.4	20950.5	23578.1	26533.3	29856.8	33594.4	37797.2	42523.1	47836.9	53811.2	470514.0
ANALYSIS INCLUDING CONSUMER EQUIPMENT												
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
CASH FLOW BEFORE FINANCING	66	18614.4	20950.5	23578.1	26533.3	29856.8	33594.4	37797.2	42523.1	47836.9	53811.2	451823.3
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	530.6	610.2	701.7	806.9	928.0	1067.2	1227.3	1411.4	1623.1	1866.5	14093.9
- INTEREST EXPENSE	69	1615.9	1536.3	1444.8	1339.6	1218.5	1079.3	919.2	735.1	523.4	280.0	50301.2
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14093.9
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4452.2
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	16467.9	18804.0	21431.6	24386.8	27710.3	31447.9	35650.7	40376.6	45690.4	51664.7	397070.0
ACCUMULATIVE TOTAL	71	99907.0	118711.0	140142.6	164529.4	192239.7	223687.6	259338.3	299715.0	345405.3	397070.0	
NCF DISCOUNTED AT 13%	4	775.7	783.8	790.6	796.1	800.5	804.0	806.6	808.6	809.5	810.1	11100.4
NCF DISCOUNTED AT 15%	5	500.3	496.7	492.3	487.1	481.3	475.0	468.2	461.1	453.7	446.1	5662.0
NCF DISCOUNTED AT 17%	6	325.1	317.3	309.1	300.6	291.9	283.1	274.4	265.6	256.9	248.2	2244.3
OTHER FINANCIAL ARRANGEMENTS												
EQUITY RECOVERED (REQUIRED)	70	16467.9	18804.0	21431.6	24386.8	27710.3	31447.9	35650.7	40376.6	45690.4	51664.7	397070.0
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC												
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24383.0
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14093.9
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38476.9
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4452.2

ASSUMPTIONS ABOUT INFLATION

		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
LABOUR													
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	14	1.110	1.232	1.368	1.518	1.685	1.870	2.076	2.305	2.558	2.839	3.152	3.498
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
TRUCKING													
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	18	1.110	1.232	1.368	1.518	1.685	1.870	2.076	2.305	2.558	2.839	3.152	3.498
ELECTRICITY													
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500
CUMULATIVE FACTOR	20	1.115	1.243	1.386	1.546	1.723	1.922	2.143	2.389	2.664	2.970	3.311	3.692
OIL													
RATE (PERCENT)	21	15.000	15.000	15.000	15.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	22	1.150	1.323	1.521	1.749	1.959	2.194	2.457	2.752	3.082	3.452	3.866	4.330
COAL													
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	24	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896
CAPITAL COSTS													
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	26	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	28	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896

REVENUE AND COST CALCULATIONS

		1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31		86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY CONVERSION EFFICIENCY	32		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33		86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY SELLING PRICE ($/GJ)	34		8.400	9.408	10.537	11.801	13.218	14.804	16.580	18.570	20.798	23.294	26.089	29.220
TOTAL REVENUE	35		730.0	1584.3	2229.6	2775.7	3332.1	3767.5	4294.2	4893.1	5571.8	6240.4	6989.3	7828.0
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36		95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONVERSION EFFICIENCY	37		.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38		115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL PURCHASE PRICE ($/GJ)	39		7.347	8.449	9.717	11.174	12.515	14.017	15.699	17.583	19.693	22.056	24.703	27.667
COST OF OIL	40		851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL														
ENERGY PRODUCED (GJ)	41		0.0	183.4	230.7	256.2	274.2	276.9	281.9	286.9	291.8	291.8	291.8	291.8
CONVERSION EFFICIENCY	42		.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43		0.0	229.3	288.4	320.3	342.8	346.1	352.4	358.6	364.8	364.8	364.8	364.8
COAL PURCHASE PRICE ($/GJ)	44		.961	1.076	1.205	1.350	1.512	1.694	1.897	2.124	2.379	2.665	2.985	3.343
COST OF COAL	45		0.0	246.7	347.6	432.4	518.3	586.2	668.4	761.9	867.9	972.0	1088.6	1219.3
ELECTRICITY														
COST OF ELECTRICITY	50		27.5	77.3	86.2	165.7	184.7	206.0	229.7	256.1	285.5	318.4	355.0	395.8
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51		0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
ROUND TRIP DISTANCE (KM)	52		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53		0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
TRUCKING PRICE ($/TONNE KM)	54		2.930	3.253	3.611	4.008	4.449	4.938	5.481	6.084	6.753	7.496	8.321	9.236
COST OF TRUCKING	55		0.0	50.6	70.7	87.1	103.5	116.0	131.2	148.1	167.3	185.7	206.1	228.8
PROJECT CAPITAL COSTS														
POWER PLANT	61		7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISTRIBUTION SYSTEM AND INITAIL	62		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63		7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSUMER EQUIPMENT	64		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPME	65		7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ASSUMPTIONS ABOUT INFLATION

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GENERAL														
	RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
	CUMULATIVE FACTORS	12	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
LABOUR														
	RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
	CUMULATIVE FACTOR	14	3.883	4.310	4.785	5.311	5.895	6.544	7.263	8.062	8.949	9.934	11.026	12.239
MATERIALS														
	RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
	CUMULATIVE FACTOR	16	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
TRUCKING														
	RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
	CUMULATIVE FACTOR	18	3.883	4.310	4.785	5.311	5.895	6.544	7.263	8.062	8.949	9.934	11.026	12.239
ELECTRICITY														
	RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500
	CUMULATIVE FACTOR	20	4.117	4.590	5.118	5.707	6.363	7.095	7.911	8.821	9.835	10.966	12.227	13.633
OIL														
	RATE (PERCENT)	21	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
	CUMULATIVE FACTOR	22	4.850	5.432	6.084	6.814	7.632	8.548	9.573	10.722	12.009	13.450	15.064	16.871
COAL														
	RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
	CUMULATIVE FACTOR	24	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179
CAPITAL COSTS														
	RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
	CUMULATIVE FACTOR	26	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179
REVENUE (ENERGY SELLING PRICE)														
	RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
	CUMULATIVE FACTOR	28	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179

REVENUE AND COST CALCULATIONS

		1 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
PROJECT REVENUE													
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9
ENERGY SELLING PRICE ($/GJ)	34	32.726	36.653	41.052	45.978	51.495	57.675	64.596	72.347	81.029	90.752	101.643	113.840
TOTAL REVENUE	35	8767.3	9819.4	10997.8	12317.5	13795.6	15451.1	17305.2	19381.8	21707.6	24312.5	27230.1	30497.7
PROJECT OPERATING COSTS													
OIL													
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL PURCHASE PRICE ($/GJ)	39	30.987	34.706	38.871	43.535	48.759	54.611	61.164	68.503	76.724	85.931	96.242	107.792
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL													
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8
COAL PURCHASE PRICE ($/GJ)	44	3.744	4.193	4.696	5.260	5.891	6.598	7.390	8.277	9.270	10.382	11.628	13.023
COST OF COAL	45	1365.6	1529.4	1713.0	1918.5	2148.8	2406.6	2695.4	3018.9	3381.1	3786.9	4241.3	4750.2
ELECTRICITY													
COST OF ELECTRICITY	50	441.3	492.1	548.7	611.8	682.1	760.6	848.0	945.6	1054.3	1175.6	1310.7	1461.5
COST OF TRUCKING													
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77
TRUCKING PRICE ($/TONNE KM)	54	10.252	11.380	12.631	14.021	15.563	17.275	19.175	21.285	23.626	26.225	29.109	32.311
COST OF TRUCKING	55	253.9	281.9	312.9	347.3	385.5	427.9	475.0	527.2	585.2	649.6	721.0	800.4
PROJECT CAPITAL COSTS													
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ASSUMPTIONS ABOUT INFLATION

		1 2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
GENERAL												
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTORS	12	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
LABOUR												
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	
CUMULATIVE FACTOR	14	13.585	15.080	16.739	18.580	20.624	22.892	25.410	28.206	31.308	34.752	
MATERIALS												
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	16	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
TRUCKING												
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	
CUMULATIVE FACTOR	18	13.585	15.080	16.739	18.580	20.624	22.892	25.410	28.206	31.308	34.752	
ELECTRICITY												
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	
CUMULATIVE FACTOR	20	15.201	16.949	18.898	21.072	23.495	26.197	29.209	32.568	36.314	40.490	
OIL												
RATE (PERCENT)	21	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	22	18.896	21.164	23.703	26.548	29.733	33.301	37.297	41.773	46.786	52.400	
COAL												
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	24	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	
CAPITAL COSTS												
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	26	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	
REVENUE (ENERGY SELLING PRICE)												
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	28	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	

REVENUE AND COST CALCULATIONS

		1 2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
PROJECT REVENUE												
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY SELLING PRICE ($/GJ)	34	127.500	142.801	159.937	179.129	200.624	224.699	251.663	281.863	315.687	353.569	
TOTAL REVENUE	35	34157.4	38256.3	42847.0	47988.7	53747.3	60197.0	67420.6	75511.1	84572.4	94721.1	861238.5
PROJECT OPERATING COSTS												
OIL												
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.9
OIL PURCHASE PRICE ($/GJ)	39	120.727	135.214	151.439	169.612	189.966	212.761	238.293	266.888	298.914	334.784	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
COAL												
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	9377.0
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	11721.3
COAL PURCHASE PRICE ($/GJ)	44	14.586	16.336	18.297	20.492	22.951	25.706	28.790	32.245	36.115	40.448	
COST OF COAL	45	5320.3	5958.7	6673.7	7474.6	8371.5	9376.1	10501.3	11761.4	13172.8	14753.5	134028.7
ELECTRICITY												
COST OF ELECTRICITY	50	1629.5	1816.9	2025.9	2258.9	2518.6	2808.3	3131.2	3491.3	3892.8	4340.5	40834.3
COST OF TRUCKING												
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
TRUCKING PRICE ($/TONNE KM)	54	35.866	39.811	44.190	49.051	54.447	60.436	67.084	74.463	82.654	91.746	
COST OF TRUCKING	55	888.4	986.1	1094.6	1215.0	1348.6	1497.0	1661.7	1844.4	2047.3	2272.5	22118.6
PROJECT CAPITAL COSTS												
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7

CASHFLOW SUMMARY (000'S)

		1 1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
REVENUE	35	716.9	1528.2	2112.3	2582.7	3045.1	3381.5	3785.4	4236.3	4737.7	5211.5	5732.6	6305.9
-COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	0.0	238.0	329.3	402.3	473.6	526.1	589.2	659.6	737.9	811.7	892.9	982.2
-COST OF ELECTRICITY	50	27.2	75.3	92.8	157.0	172.6	189.9	208.9	229.8	252.8	278.0	305.9	336.4
-OPERATING AND MAINTENANCE LABOU	56	505.2	612.5	673.8	741.1	815.2	896.8	986.4	1085.1	1193.6	1313.0	1444.2	1588.7
-OPERATING AND MAINTENANCE MATER	57	36.4	71.0	78.1	111.9	123.0	135.3	148.9	163.8	180.1	198.2	218.0	239.8
-COST OF TRUCKING	55	0.0	49.7	68.8	84.0	98.9	109.9	123.1	137.8	154.2	169.6	186.6	205.2
TOTAL OPERATING EXPENDITURES	59	1420.0	1046.5	1232.8	1496.3	1683.5	1858.0	2056.5	2276.0	2518.6	2770.5	3047.6	3352.3
CASH FLOW BEFORE CAPITAL COSTS	60	-703.1	481.7	879.5	1086.4	1361.6	1523.4	1728.9	1960.2	2219.1	2441.0	2685.1	2953.6
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	-7713.4	-5436.4	879.5	-3954.5	1361.6	1523.4	1728.9	1960.2	2219.1	2441.0	2685.1	2953.6
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	0.0	0.0	0.0	0.0	31.6	36.4	41.8	48.1	55.3	63.6	73.1	84.1
- INTEREST EXPENSE	69	0.0	0.0	0.0	0.0	2061.5	2056.7	2051.3	2045.0	2037.8	2029.5	2020.0	2009.0
+ OPTIONAL LOAN D/D	127	4975.1	4252.7	504.7	4010.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	347.1	990.9	1384.2	1637.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	-3085.4	-2174.6	0.0	-1581.8	-731.5	-569.7	-364.2	-132.8	126.0	347.9	592.0	860.5
ACCUMULATIVE TOTAL	71	-3085.4	-5259.9	-5259.9	-6841.7	-7573.2	-8142.9	-8507.1	-8639.9	-8513.9	-8166.0	-7574.0	-6713.5
NCF DISCOUNTED AT 13%	4	-2730.4	-1703.0	0.0	-970.1	-397.0	-273.6	-154.8	-50.0	41.9	102.5	154.3	198.5
NCF DISCOUNTED AT 15%	5	-2682.9	-1644.3	0.0	-904.4	-363.7	-246.3	-136.9	-43.4	35.8	86.0	127.2	160.8
NCF DISCOUNTED AT 17%	6	-2637.1	-1588.5	0.0	-844.1	-333.6	-222.1	-121.4	-37.8	30.7	72.4	105.3	130.8
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	-3085.4	-2174.6	0.0	-1581.8	-731.5	-569.7	-364.2	-132.8	126.0	347.9	592.0	860.5
DCF RATE OF RETURN (%)	103	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D ANC REPAY CALC													
OPENING BALANCE	126	0.0	4975.1	9227.9	9732.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	4975.1	4252.7	504.7	4010.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	4975.1	9227.9	9732.6	13743.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	347.1	990.9	1384.2	1637.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CASHFLOW SUMMARY (000'S)

	1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
REVENUE	35	6936.5	7630.1	8393.1	9232.4	10155.7	11171.3	12288.4	13517.2	14869.0	16355.8	17991.4	19790.6
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	1080.4	1188.4	1307.3	1438.0	1581.8	1740.0	1914.0	2105.4	2315.9	2547.5	2802.3	3082.5
-COST OF ELECTRICITY	50	370.1	407.1	447.8	492.6	541.8	596.0	655.6	721.2	793.3	872.6	959.9	1055.9
-OPERATING AND MAINTENANCE LABOU	56	1747.5	1922.3	2114.5	2326.0	2558.6	2814.4	3095.9	3405.5	3746.0	4120.6	4532.7	4985.9
-OPERATING AND MAINTENANCE MATER	57	263.8	290.1	319.1	351.1	386.2	424.8	467.3	514.0	565.4	621.9	684.1	752.5
-COST OF TRUCKING	55	225.8	248.3	273.2	300.5	330.5	363.6	399.9	439.9	483.9	532.3	585.5	644.1
TOTAL OPERATING EXPENDITURES	59	3687.5	4056.3	4461.9	4908.1	5398.9	5938.8	6532.7	7186.0	7904.6	8695.0	9564.5	10521.0
CASH FLOW BEFORE CAPITAL COSTS	60	3248.9	3573.8	3931.2	4324.3	4756.8	5232.4	5755.7	6331.3	6964.4	7660.8	8426.9	9269.6
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	3248.9	3573.8	3931.2	4324.3	4756.8	5232.4	5755.7	6331.3	6964.4	7660.8	8426.9	9269.6
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	96.7	111.2	127.9	147.1	169.1	194.5	223.7	257.2	295.8	340.2	391.2	449.9
- INTEREST EXPENSE	69	1996.4	1981.9	1965.2	1946.0	1923.9	1898.6	1869.4	1835.9	1797.3	1752.9	1701.9	1643.2
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	1155.9	1480.8	1838.1	2231.3	2663.7	3139.4	3662.6	4238.2	4871.3	5567.7	6333.8	7176.5
ACCUMULATIVE TOTAL	71	-5557.7	-4076.9	-2238.8	-7.5	2656.2	5795.5	9458.1	13696.3	18567.6	24135.4	30469.2	37645.7
NCF DISCOUNTED AT 13%	4	236.0	267.5	293.9	315.7	333.5	347.9	359.2	367.8	374.1	378.4	380.9	382.0
NCF DISCOUNTED AT 15%	5	187.9	209.3	225.9	238.4	247.5	253.7	257.4	259.0	258.8	257.2	254.5	250.7
NCF DISCOUNTED AT 17%	6	150.1	164.4	174.4	181.0	184.6	186.0	185.5	183.4	180.2	176.0	171.2	165.7
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	1155.9	1480.8	1838.1	2231.3	2663.7	3139.4	3662.6	4238.2	4871.3	5567.7	6333.8	7176.5
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

WRIGHT ENGINEERS LIMITED
1444 ALBERNI STREET
VANCOUVER B C V6G 2Z4

CASHFLOW SUMMARY (000'S)

		1 2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
REVENUE	35	21769.6	23946.6	26341.3	28975.4	31872.9	35060.2	38566.2	42422.9	46665.1	51331.7	538659.5
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
-COST OF COAL	45	3390.8	3729.9	4102.8	4513.1	4964.4	5460.9	6007.0	6607.7	7268.4	7995.3	83786.9
-COST OF ELECTRICITY	50	1161.5	1277.6	1405.4	1545.9	1700.5	1870.6	2057.6	2263.4	2489.7	2738.7	28741.5
-OPERATING AND MAINTENANCE LABOU	56	5484.5	6033.0	6636.3	7299.9	8029.9	8832.9	9716.2	10687.8	11756.6	12932.2	136634.7
-OPERATING AND MAINTENANCE MATER	57	827.8	910.5	1001.6	1101.8	1211.9	1333.1	1466.4	1613.1	1774.4	1951.8	20537.3
-COST OF TRUCKING	55	708.5	779.4	857.3	943.0	1037.3	1141.1	1255.2	1380.7	1518.8	1670.6	17507.4
TOTAL OPERATING EXPENDITURES	59	11573.1	12730.4	14003.4	15403.9	16944.1	18638.5	20502.4	22552.6	24807.9	27288.7	288059.0
CASH FLOW BEFORE CAPITAL COSTS	60	10196.6	11216.2	12337.8	13571.6	14928.8	16421.7	18063.8	19870.2	21857.2	24043.0	250600.5
ANALYSIS INCLUDING CONSUMER EQUIPMENT												
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
CASH FLOW BEFORE FINANCING	66	10196.6	11216.2	12337.8	13571.6	14928.8	16421.7	18063.8	19870.2	21857.2	24043.0	232631.2
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	517.4	595.0	684.2	786.9	904.9	1040.6	1196.7	1376.2	1582.7	1820.1	13743.1
- INTEREST EXPENSE	69	1575.7	1498.1	1408.8	1306.2	1188.2	1052.4	896.4	716.8	510.4	273.0	49049.3
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13743.1
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4360.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	8103.5	9123.1	10244.8	11478.5	12835.7	14328.6	15970.7	17777.1	19764.2	21949.9	179221.8
ACCUMULATIVE TOTAL	71	45749.2	54872.3	65117.1	76595.6	89431.3	103759.9	119730.7	137507.8	157271.9	179221.8	
NCF DISCOUNTED AT 13%	4	381.7	380.3	377.9	374.7	370.8	366.3	361.3	355.9	350.2	344.2	1918.5
NCF DISCOUNTED AT 15%	5	246.2	241.0	235.3	229.3	222.9	216.4	209.7	203.0	196.3	189.5	-522.2
NCF DISCOUNTED AT 17%	6	160.0	153.9	147.7	141.5	135.2	129.0	122.9	116.9	111.1	105.5	-2019.3
OTHER FINANCIAL ARRANGEMENTS												
EQUITY RECOVERED (REQUIRED)	70	8103.5	9123.1	10244.8	11478.5	12835.7	14328.6	15970.7	17777.1	19764.2	21949.9	179221.8
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC												
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23935.6
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13743.1
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37678.7
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4360.0

ASSUMPTIONS ABOUT INFLATION

		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
LABOUR													
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	14	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
TRUCKING													
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	18	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
ELECTRICITY													
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	20	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
OIL													
RATE (PERCENT)	21	15.000	15.000	15.000	15.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	22	1.150	1.323	1.521	1.749	1.924	2.116	2.328	2.561	2.817	3.098	3.408	3.749
COAL													
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	24	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
CAPITAL COSTS													
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	26	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	28	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138

REVENUE AND COST CALCULATIONS

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
PROJECT REVENUE													
TOTAL HEAT CONSUMED	31	86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY SELLING PRICE ($/GJ)	34	8.250	9.075	9.982	10.981	12.079	13.287	14.615	16.077	17.685	19.453	21.398	23.538
TOTAL REVENUE	35	716.9	1528.2	2112.3	2582.7	3045.1	3381.5	3785.4	4236.3	4737.7	5211.5	5732.6	6305.9
PROJECT OPERATING COSTS													
OIL													
ENERGY PRODUCED (GJ)	36	95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL PURCHASE PRICE ($/GJ)	39	7.347	8.449	9.717	11.174	12.292	13.521	14.873	16.360	17.996	19.796	21.776	23.953
COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL													
ENERGY PRODUCED (GJ)	41	0.0	183.4	230.7	256.2	274.2	276.9	281.9	286.9	291.8	291.8	291.8	291.8
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	0.0	229.3	288.4	320.3	342.8	346.1	352.4	358.6	364.8	364.8	364.8	364.8
COAL PURCHASE PRICE ($/GJ)	44	.944	1.038	1.142	1.256	1.382	1.520	1.672	1.839	2.023	2.225	2.448	2.693
COST OF COAL	45	0.0	238.0	329.3	402.3	473.6	526.1	589.2	659.6	737.9	811.7	892.9	982.2
ELECTRICITY													
COST OF ELECTRICITY	50	27.2	75.3	82.8	157.0	172.6	189.9	208.9	229.8	252.8	278.0	305.9	336.4
COST OF TRUCKING													
COAL AND ASH TO BE TRUCKED (TONS	51	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
TRUCKING PRICE ($/TONNE KM)	54	2.904	3.194	3.514	3.865	4.252	4.677	5.145	5.659	6.225	6.847	7.532	8.285
COST OF TRUCKING	55	0.0	49.7	68.8	84.0	98.9	109.9	123.1	137.8	154.2	169.6	186.6	205.2
PROJECT CAPITAL COSTS													
POWER PLANT	61	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPME	65	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

WRIGHT ENGINEERS LIMITED
1444 ALBERNI STREET
VANCOUVER B.C. V6G 2Z4

ASSUMPTIONS ABOUT INFLATION

		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
LABOUR													
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	14	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
TRUCKING													
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	18	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
ELECTRICITY													
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	20	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
OIL													
RATE (PERCENT)	21	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	22	4.124	4.536	4.990	5.489	6.038	6.642	7.306	8.037	8.840	9.724	10.697	11.766
COAL													
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	24	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
CAPITAL COSTS													
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	26	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	28	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850

WRIGHT ENGINEERS LIMITED
1444 ALBERNI STREET
VANCOUVER B C V6G 2Z4

REVENUE AND COST CALCULATIONS

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY SELLING PRICE ($/GJ)	34	25.892	28.481	31.329	34.462	37.909	41.699	45.869	50.456	55.502	61.052	67.157	73.873	
TOTAL REVENUE	35	6936.5	7630.1	8393.1	9232.4	10155.7	11171.3	12288.4	13517.2	14869.0	16355.8	17991.4	19790.6	
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
OIL PURCHASE PRICE ($/GJ)	39	26.349	28.984	31.882	35.070	38.577	42.435	46.678	51.346	56.481	62.129	68.342	75.176	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
COAL														
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	
COAL PURCHASE PRICE ($/GJ)	44	2.962	3.258	3.584	3.942	4.337	4.770	5.247	5.772	6.349	6.984	7.683	8.451	
COST OF COAL	45	1080.4	1188.4	1307.3	1438.0	1581.8	1740.0	1914.0	2105.4	2315.9	2547.5	2802.3	3082.5	
ELECTRICITY														
COST OF ELECTRICITY	50	370.1	407.1	447.8	492.6	541.8	596.0	655.6	721.2	793.3	872.6	959.9	1055.9	
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
TRUCKING PRICE ($/TONNE KM)	54	9.114	10.025	11.028	12.131	13.344	14.678	16.146	17.761	19.537	21.490	23.639	26.003	
COST OF TRUCKING	55	225.8	248.3	273.2	300.5	330.5	363.6	399.9	439.9	483.9	532.3	585.5	644.1	
PROJECT CAPITAL COSTS														
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

ASSUMPTIONS ABOUT INFLATION

		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
GENERAL												
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTORS	12	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
LABOUR												
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	14	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
MATERIALS												
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	16	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
TRUCKING												
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	18	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
ELECTRICITY												
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	20	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
OIL												
RATE (PERCENT)	21	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	22	12.943	14.237	15.661	17.227	18.950	20.845	22.929	25.222	27.745	30.519	
COAL												
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	24	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
CAPITAL COSTS												
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	26	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
REVENUE (ENERGY SELLING PRICE)												
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	28	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	

REVENUE AND COST CALCULATIONS

	1	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
PROJECT REVENUE												
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY SELLING PRICE ($/GJ)	34	81.260	89.386	98.325	108.157	118.973	130.871	143.958	158.353	174.189	191.608	
TOTAL REVENUE	35	21769.6	23946.6	26341.3	28975.4	31872.9	35060.2	38566.2	42422.9	46665.1	51331.7	538659.5
PROJECT OPERATING COSTS												
OIL												
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.9
OIL PURCHASE PRICE ($/GJ)	39	82.693	90.963	100.059	110.065	121.071	133.178	146.496	161.146	177.261	194.987	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
COAL												
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	9377.0
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	11721.3
COAL PURCHASE PRICE ($/GJ)	44	9.296	10.226	11.248	12.373	13.611	14.972	16.469	18.116	19.927	21.920	
COST OF COAL	45	3390.8	3729.9	4102.8	4513.1	4964.4	5460.9	6007.0	6607.7	7268.4	7995.3	83786.9
ELECTRICITY												
COST OF ELECTRICITY	50	1161.5	1277.6	1405.4	1545.9	1700.5	1870.6	2057.6	2263.4	2489.7	2738.7	28741.5
COST OF TRUCKING												
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
TRUCKING PRICE ($/TONNE KM)	54	28.604	31.464	34.610	38.071	41.879	46.066	50.673	55.740	61.314	67.446	
COST OF TRUCKING	55	708.5	779.4	857.3	943.0	1037.3	1141.1	1255.2	1380.7	1518.8	1670.6	17507.4
PROJECT CAPITAL COSTS												
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3

APPENDIX E

COMPUTER RESULTS WITH A SUBSIDY

CASHFLOW SUMMARY (000'S)

		1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
REVENUE	35	730.0	1584.3	2229.6	2775.7	3332.1	3767.5	4294.2	4893.1	5571.8	6240.4	6989.3	7828.0
-COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	0.0	246.7	347.6	432.4	518.3	586.2	668.4	761.9	867.9	972.0	1088.6	1219.3
-COST OF ELECTRICITY	50	27.5	77.3	86.2	165.7	184.7	206.0	229.7	256.1	285.5	318.4	355.0	395.8
-OPERATING AND MAINTENANCE LABOU	56	509.8	623.7	692.3	768.4	853.0	946.8	1051.0	1166.6	1294.9	1437.3	1595.4	1770.9
-OPERATING AND MAINTENANCE MATER	57	36.4	71.0	78.1	111.9	123.0	135.3	148.9	163.8	180.1	198.2	218.0	239.8
-COST OF TRUCKING	55	0.0	50.6	70.7	87.1	103.5	116.0	131.2	148.1	167.3	185.7	206.1	228.8
TOTAL OPERATING EXPENDITURES	59	1425.0	1069.4	1275.0	1565.5	1782.5	1990.4	2229.0	2496.4	2795.7	3111.5	3463.1	3854.5
CASH FLOW BEFORE CAPITAL COSTS	60	-695.0	514.9	954.6	1210.2	1549.6	1777.2	2065.2	2396.7	2776.1	3128.9	3526.2	3973.4
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	7137.8	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	-7832.8	-5620.4	954.6	-4207.4	1549.6	1777.2	2065.2	2396.7	2776.1	3128.9	3526.2	3973.4
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	0.0	0.0	0.0	0.0	55.7	64.1	73.7	84.7	97.4	112.1	128.9	148.2
- INTEREST EXPENSE	69	0.0	0.0	0.0	0.0	3633.3	3624.9	3615.3	3604.2	3591.5	3576.9	3560.1	3540.8
+ OPTIONAL LOAN D/D	127	8420.3	7304.9	1404.1	7092.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	587.5	1684.6	2358.8	2885.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	2139.4	1911.8	1623.8	1292.3	912.9	560.1	162.8	0.0
NET CASH FLOW	70	-.0	-.0	0.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	284.5
ACCUMULATIVE TOTAL	71	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	284.5
NCF DISCOUNTED AT 13%	4	-.0	-.0	0.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.6
NCF DISCOUNTED AT 15%	5	-.0	-.0	0.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.2
NCF DISCOUNTED AT 17%	6	-.0	-.0	0.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.2
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	-.0	-.0	0.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	284.5
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	2139.4	1911.8	1623.8	1292.3	912.9	560.1	162.8	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	1063.6	826.5	610.4	422.4	259.5	138.4	35.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	8420.3	15725.2	17129.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	8420.3	7304.9	1404.1	7092.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	8420.3	15725.2	17129.3	24221.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	587.5	1684.6	2358.8	2885.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

WRIGHT ENGINEERS LIMITED
1444 ALBERNI STREET
VANCOUVER, B.C. V6G 2Z4

CASHFLOW SUMMARY (000'S)

	1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
REVENUE	35	8767.3	9819.4	10997.8	12317.5	13795.6	15451.1	17305.2	19381.8	21707.6	24312.5	27230.1	30497.7
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	1365.6	1529.4	1713.0	1918.5	2148.8	2406.6	2695.4	3018.9	3381.1	3786.9	4241.3	4750.2
-COST OF ELECTRICITY	50	441.3	492.1	548.7	611.8	682.1	760.6	848.0	945.6	1054.3	1175.6	1310.7	1461.5
-OPERATING AND MAINTENANCE LABOU	56	1965.7	2181.9	2422.0	2688.4	2984.1	3312.3	3676.7	4081.1	4530.1	5028.4	5581.5	6195.5
-OPERATING AND MAINTENANCE MATER	57	263.8	290.1	319.1	351.1	386.2	424.8	467.3	514.0	565.4	621.9	684.1	752.5
-COST OF TRUCKING	55	253.9	281.9	312.9	347.3	385.5	427.9	475.0	527.2	585.2	649.6	721.0	800.4
TOTAL OPERATING EXPENDITURES	59	4290.3	4775.5	5315.6	5917.0	6586.6	7332.2	8162.4	9086.8	10116.1	11262.3	12538.7	13960.0
CASH FLOW BEFORE CAPITAL COSTS	60	4477.0	5043.9	5682.1	6400.5	7208.9	8118.8	9142.8	10295.0	11591.5	13050.3	14691.4	16537.6
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	4477.0	5043.9	5682.1	6400.5	7208.9	8118.8	9142.8	10295.0	11591.5	13050.3	14691.4	16537.6
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	170.4	196.0	225.4	259.2	298.1	342.8	394.2	453.4	521.4	599.6	689.5	792.9
- INTEREST EXPENSE	69	3518.5	3493.0	3463.6	3429.8	3390.9	3346.2	3294.7	3235.6	3167.6	3089.4	2999.5	2896.1
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	788.1	1355.0	1993.2	2711.5	3520.0	4429.9	5453.8	6606.1	7902.6	9361.3	11002.4	12848.6
ACCUMULATIVE TOTAL	71	1072.5	2427.5	4420.7	7132.1	10652.1	15082.0	20535.8	27141.9	35044.5	44405.8	55408.2	68256.8
NCF DISCOUNTED AT 13%	4	160.9	244.8	318.7	383.7	440.8	490.9	534.8	573.3	606.9	636.2	661.7	683.9
NCF DISCOUNTED AT 15%	5	128.1	191.5	244.9	289.8	327.1	358.0	383.2	403.6	419.9	432.5	442.0	448.9
NCF DISCOUNTED AT 17%	6	102.4	150.4	189.1	219.9	244.0	262.4	276.2	285.9	292.3	296.0	297.3	296.8
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	788.1	1355.0	1993.2	2711.5	3520.0	4429.9	5453.8	6606.1	7902.6	9361.3	11002.4	12848.6
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CASHFLOW SUMMARY (000'S)

		1 2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
REVENUE	35	34157.4	38256.3	42847.0	47988.7	53747.3	60197.0	67420.6	75511.1	84572.4	94721.1	861238.5
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
-COST OF COAL	45	5320.3	5958.7	6673.7	7474.6	8371.5	9376.1	10501.3	11761.4	13172.8	14753.5	134028.7
-COST OF ELECTRICITY	50	1629.5	1816.9	2025.9	2258.9	2518.6	2808.3	3131.2	3491.3	3892.8	4340.5	40834.3
-OPERATING AND MAINTENANCE LABOU	56	6877.0	7633.4	8473.1	9405.1	10439.7	11588.1	12862.8	14277.7	15848.2	17591.5	172354.4
-OPERATING AND MAINTENANCE MATER	57	827.8	910.5	1001.6	1101.8	1211.9	1333.1	1466.4	1613.1	1774.4	1951.8	20537.3
-COST OF TRUCKING	55	888.4	986.1	1094.6	1215.0	1348.6	1497.0	1661.7	1844.4	2047.3	2272.5	22118.6
TOTAL OPERATING EXPENDITURES	59	15542.9	17305.7	19268.9	21455.4	23890.5	26602.6	29623.4	32987.9	36735.6	40909.9	390724.5
CASH FLOW BEFORE CAPITAL COSTS	60	18614.4	20950.5	23578.1	26533.3	29856.8	33594.4	37797.2	42523.1	47836.9	53811.2	470514.0
ANALYSIS INCLUDING CONSUMER EQUIPMENT												
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
CASH FLOW BEFORE FINANCING	66	18614.4	20950.5	23578.1	26533.3	29856.8	33594.4	37797.2	42523.1	47836.9	53811.2	451823.3
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	911.9	1048.6	1205.9	1386.8	1594.8	1834.1	2109.2	2425.6	2789.4	3207.8	24221.7
- INTEREST EXPENSE	69	2777.1	2640.3	2483.0	2302.1	2094.1	1854.9	1579.8	1263.4	899.6	481.2	86447.4
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24221.7
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7515.8
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8602.9
NET CASH FLOW	70	14925.5	17261.6	19889.1	22844.3	26167.9	29905.4	34108.3	38836.2	44147.9	50122.2	366463.1
ACCUMULATIVE TOTAL	71	83182.3	100443.9	120333.0	143177.3	169345.2	199250.6	233358.9	272193.0	316340.9	366463.1	
NCF DISCOUNTED AT 13%	4	703.0	719.5	733.7	745.7	756.0	764.5	771.7	777.5	782.2	785.9	13341.9
NCF DISCOUNTED AT 15%	5	453.4	456.0	456.9	456.3	454.5	451.7	447.9	443.5	438.4	432.8	8613.9
NCF DISCOUNTED AT 17%	6	294.6	291.2	286.8	281.6	275.7	269.3	262.5	255.4	248.2	240.8	5662.0
OTHER FINANCIAL ARRANGEMENTS												
EQUITY RECOVERED (REQUIRED)	70	14925.5	17261.6	19389.1	22844.3	26167.9	29905.4	34108.3	38836.2	44147.9	50122.2	366463.1
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8602.9
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3356.0
OPTIONAL LOAN D/D AND REPAY CALC												
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61274.7
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24221.7
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65496.4
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7515.8

ASSUMPTIONS ABOUT INFLATION

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	12	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.139
LABOUR													
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	14	1.110	1.232	1.368	1.518	1.685	1.870	2.076	2.305	2.558	2.839	3.152	3.499
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.139
TRUCKING													
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	18	1.110	1.232	1.368	1.518	1.685	1.870	2.076	2.305	2.558	2.839	3.152	3.499
ELECTRICITY													
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500
CUMULATIVE FACTOR	20	1.115	1.243	1.386	1.544	1.723	1.922	2.143	2.389	2.664	2.970	3.311	3.692
OIL													
RATE (PERCENT)	21	15.000	15.000	15.000	15.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	22	1.150	1.323	1.521	1.749	1.959	2.194	2.457	2.752	3.082	3.452	3.866	4.330
COAL													
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	24	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896
CAPITAL COSTS													
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	26	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	28	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773	3.106	3.479	3.896

[redacted]

REVENUE AND COST CALCULATIONS

		1	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31	66.6	149.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	66.6	149.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY SELLING PRICE ($/GJ)	34	9.400	9.400	10.537	11.901	13.219	14.804	16.580	18.570	20.799	23.294	26.089	29.220
TOTAL REVENUE	35	730.6	1404.3	2229.4	2775.7	3332.1	3767.5	4294.2	4893.1	5571.8	6240.4	6989.3	7828.0
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36	66.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL PURCHASE PRICE ($/GJ)	39	7.347	7.449	9.717	11.174	12.515	14.017	15.698	17.583	19.693	22.056	24.703	27.667
COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL														
ENERGY PRODUCED (GJ)	41	0.0	143.4	230.7	236.2	274.2	276.7	281.9	286.9	291.8	291.8	291.8	291.8
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	0.0	229.3	288.4	320.3	342.8	344.1	352.4	358.6	364.8	364.8	364.8	364.8
COAL PURCHASE PRICE ($/GJ)	44	.961	1.074	1.208	1.353	1.512	1.694	1.897	2.124	2.379	2.665	2.985	3.343
COST OF COAL	45	0.0	246.7	347.6	432.4	518.2	586.2	668.4	761.9	867.9	972.0	1088.6	1219.3
ELECTRICITY														
COST OF ELECTRICITY	50	27.5	77.2	96.2	165.7	134.7	206.0	229.7	256.1	285.5	318.4	355.0	395.8
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
TRUCKING PRICE ($/TONNE KM)	54	2.930	3.253	3.611	4.009	4.449	4.938	5.481	6.084	6.753	7.496	8.321	9.236
COST OF TRUCKING	55	0.0	50.6	70.7	87.1	103.5	116.0	131.2	148.1	167.3	185.7	206.1	228.8
PROJECT CAPITAL COSTS														
POWER PLANT	61	7137.9	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISTRIBUTION SYSTEM AND RETAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	63	7137.9	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME	65	7137.9	6135.3	0.0	5417.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ASSUMPTIONS ABOUT INFLATION

	1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	12	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
LABOUR													
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	14	3.833	4.310	4.785	5.311	5.895	6.544	7.263	8.062	8.949	9.934	11.026	12.239
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
TRUCKING													
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
CUMULATIVE FACTOR	18	3.833	4.310	4.785	5.311	5.895	6.544	7.263	8.062	8.949	9.934	11.026	12.239
ELECTRICITY													
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500
CUMULATIVE FACTOR	20	4.117	4.590	5.118	5.707	6.362	7.095	7.911	8.821	9.835	10.966	12.227	13.633
OIL													
RATE (PERCENT)	21	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	22	4.850	5.432	6.084	6.814	7.632	8.548	9.573	10.722	12.009	13.450	15.064	16.871
COAL													
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	24	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179
CAPITAL COSTS													
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	26	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
CUMULATIVE FACTOR	28	4.363	4.887	5.474	6.130	6.866	7.690	8.613	9.646	10.804	12.100	13.552	15.179

REVENUE AND COST CALCULATIONS

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY SELLING PRICE ($/GJ)	34	32.726	36.653	41.052	45.978	51.495	57.675	64.596	72.347	81.029	90.752	101.643	113.840	
TOTAL REVENUE	35	8767.3	9819.4	10997.8	12317.5	13795.6	15451.1	17305.2	19381.8	21707.6	24312.5	27230.1	30497.7	
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
OIL PURCHASE PRICE ($/GJ)	39	30.987	34.706	38.871	43.535	48.759	54.611	61.164	68.503	76.724	85.931	96.242	107.792	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
COAL														
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	
COAL PURCHASE PRICE ($/GJ)	44	3.744	4.193	4.696	5.260	5.891	6.598	7.390	8.277	9.270	10.382	11.628	13.023	
COST OF COAL	45	1365.6	1529.6	1713.0	1918.5	2148.8	2406.6	2695.4	3018.9	3381.1	3786.9	4241.3	4750.2	
ELECTRICITY														
COST OF ELECTRICITY	50	441.3	492.1	548.7	611.8	682.1	760.6	848.0	945.6	1054.3	1175.6	1310.7	1461.5	
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
TRUCKING PRICE ($/TONNE KM)	54	10.252	11.380	12.631	14.021	15.563	17.275	19.175	21.285	23.626	26.225	29.109	32.311	
COST OF TRUCKING	55	253.9	281.9	312.9	347.3	385.5	427.9	475.0	527.2	585.2	649.6	721.0	800.4	
PROJECT CAPITAL COSTS														
POWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

ASSUMPTIONS ABOUT INFLATION

		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
GENERAL												
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTORS	12	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
LABOUR												
RATE (PERCENT)	13	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	
CUMULATIVE FACTOR	14	13.585	15.080	16.739	18.580	20.624	22.892	25.410	28.206	31.308	34.752	
MATERIALS												
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	16	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
TRUCKING												
RATE (PERCENT)	17	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	
CUMULATIVE FACTOR	18	13.585	15.080	16.739	18.580	20.624	22.892	25.410	28.206	31.308	34.752	
ELECTRICITY												
RATE (PERCENT)	19	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	11.500	
CUMULATIVE FACTOR	20	15.201	16.949	18.898	21.072	23.495	26.197	29.209	32.568	36.314	40.490	
OIL												
RATE (PERCENT)	21	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	22	18.896	21.164	23.703	26.548	29.733	33.301	37.297	41.773	46.786	52.400	
COAL												
RATE (PERCENT)	23	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	24	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	
CAPITAL COSTS												
RATE (PERCENT)	25	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	26	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	
REVENUE (ENERGY SELLING PRICE)												
RATE (PERCENT)	27	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	
CUMULATIVE FACTOR	28	17.000	19.040	21.325	23.884	26.750	29.960	33.555	37.582	42.092	47.143	

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REVENUE AND COST CALCULATIONS

		1	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
ROJECT REVENUE													
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	8696.6
ENERGY SELLING PRICE ($/GJ)	34	127.500	142.801	159.937	179.129	200.624	224.699	251.663	281.863	315.687	353.569		
TOTAL REVENUE	35	34157.4	38256.3	42847.0	47988.7	53747.3	60197.0	67420.6	75511.1	84572.4	94721.1		861238.5
ROJECT OPERATING COSTS													
OIL													
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.9
OIL PURCHASE PRICE ($/GJ)	39	120.727	135.214	151.439	169.612	189.966	212.761	238.293	266.888	298.914	334.784		
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
COAL													
ENERGY PRODUCED (GJ)	41	251.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	9377.0
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	366.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	11721.3
COAL PURCHASE PRICE ($/GJ)	44	14.586	16.336	18.297	20.492	22.951	25.706	28.790	32.245	36.115	40.448		
COST OF COAL	45	5320.3	5958.7	6673.7	7474.6	8371.5	9376.1	10501.3	11761.4	13172.8	14753.5		134028.7
ELECTRICITY													
COST OF ELECTRICITY	50	1629.5	1816.9	2025.9	2258.9	2518.6	2808.3	3131.2	3491.3	3892.8	4340.5		40834.3
COST OF TRUCKING													
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77		795.96
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77		795.96
TRUCKING PRICE ($/TONNE KM)	54	35.866	39.811	44.190	49.051	54.447	60.436	67.084	74.463	82.654	91.746		
COST OF TRUCKING	55	888.4	986.1	1094.6	1215.0	1348.6	1497.0	1661.7	1844.4	2047.3	2272.5		22118.6
ROJECT CAPITAL COSTS													
OWER PLANT	61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
ISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7
ONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18690.7

WRIGHT ENGINEERS LIMITED
1444 ALBERNI STREET
VANCOUVER B C V6G 2Z4

CASHFLOW SUMMARY (000'S)

	1	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
REVENUE	35	716.9	1528.2	2112.3	2582.7	3045.1	3381.5	3785.4	4236.3	4737.7	5211.5	5732.6	6305.9
-COST OF OIL	40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	0.0	238.0	329.3	402.3	473.6	526.1	583.2	659.6	737.9	811.7	892.9	982.2
-COST OF ELECTRICITY	50	27.2	75.3	82.8	157.0	172.6	189.9	208.9	229.8	252.8	278.0	305.9	336.4
-OPERATING AND MAINTENANCE LABOU	56	505.2	612.5	673.8	741.1	815.2	896.8	986.4	1085.1	1193.6	1313.0	1444.2	1588.7
-OPERATING AND MAINTENANCE MATER	57	36.4	71.0	78.1	111.9	123.0	135.3	148.9	163.8	180.1	198.2	218.0	239.8
-COST OF TRUCKING	55	0.0	49.7	68.8	94.0	98.9	109.9	123.1	137.8	154.2	169.6	186.6	205.2
TOTAL OPERATING EXPENDITURES	59	1420.0	1046.5	1232.8	1496.3	1683.5	1858.0	2056.5	2276.0	2518.6	2770.5	3047.6	3352.3
CASH FLOW BEFORE CAPITAL COSTS	60	-703.1	481.7	879.5	1086.4	1361.6	1523.4	1728.9	1960.2	2219.1	2441.0	2685.1	2953.6
ANALYSIS INCLUDING CONSUMER EQUIPMENT													
-CAPITAL COSTS	65	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	-7713.4	-5436.4	879.5	-3954.5	1361.6	1523.4	1728.9	1960.2	2219.1	2441.0	2685.1	2953.6
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	0.0	0.0	0.0	0.0	54.2	62.4	71.7	82.5	94.9	109.1	125.5	144.3
- INTEREST EXPENSE	69	0.0	0.0	0.0	0.0	3536.9	3528.8	3519.4	3508.7	3496.3	3482.1	3465.7	3446.9
+ OPTIONAL LOAN D/D	127	8291.9	7087.9	1427.5	6772.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	578.5	1651.5	2307.0	2817.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	2229.6	2067.7	1862.3	1630.9	1372.1	1150.2	906.1	637.6
NET CASH FLOW	70	-.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ACCUMULATIVE TOTAL	71	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0
NCF DISCOUNTED AT 13%	4	-.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NCF DISCOUNTED AT 15%	5	-.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NCF DISCOUNTED AT 17%	6	-.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER FINANCIAL ARRANGEMENTS													
EQUITY RECOVERED (REQUIRED)	70	-.0	-.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	2229.6	2067.7	1862.3	1630.9	1372.1	1150.2	906.1	637.6
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	1108.5	893.9	700.1	533.2	390.0	284.3	194.8	119.2
OPTIONAL LOAN D/D AND REPAY CALC													
OPENING BALANCE	126	0.0	8291.9	15379.8	16807.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	8291.9	7087.9	1427.5	6772.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	8291.9	15379.8	16807.3	23579.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	578.5	1651.5	2307.0	2817.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CASHFLOW SUMMARY (000'S)

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
REVENUE	35	6936.5	7630.1	8393.1	9232.4	10155.7	11171.3	12288.4	13517.2	14869.0	16355.8	17991.4	19790.6
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-COST OF COAL	45	1080.4	1188.4	1307.3	1438.0	1581.8	1740.0	1914.0	2105.4	2315.9	2547.5	2802.3	3082.5
-COST OF ELECTRICITY	50	370.1	407.1	447.8	492.6	541.8	596.0	655.6	721.2	793.3	872.6	959.9	1055.9
-OPERATING AND MAINTENANCE LABOU	56	1747.5	1922.3	2114.5	2326.0	2558.6	2814.4	3095.9	3405.5	3746.0	4120.6	4532.7	4985.9
-OPERATING AND MAINTENANCE MATER	57	263.8	290.1	319.1	351.1	386.2	424.9	467.3	514.0	565.4	621.9	684.1	752.5
-COST OF TRUCKING	55	225.8	248.3	273.2	300.5	330.5	363.6	399.9	439.9	483.9	532.3	585.5	644.1
TOTAL OPERATING EXPENDITURES	59	3687.5	4056.3	4461.9	4908.1	5398.9	5938.8	6532.7	7186.0	7904.6	8695.0	9564.5	10521.0
CASH FLOW BEFORE CAPITAL COSTS	60	3248.9	3573.8	3931.2	4324.3	4756.8	5232.4	5755.7	6331.3	6964.4	7660.8	8426.9	9269.6
ANALYSIS INCLUDING CONSUMER EQUIPMENT														
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH FLOW BEFORE FINANCING	66	3248.9	3573.8	3931.2	4324.3	4756.8	5232.4	5755.7	6331.3	6964.4	7660.8	8426.9	9269.6
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	165.9	190.8	219.4	252.3	290.2	333.7	383.8	441.3	507.5	583.7	671.2	771.9
- INTEREST EXPENSE	69	3425.2	3400.4	3371.7	3338.8	3301.0	3257.4	3207.4	3149.8	3083.6	3007.5	2919.9	2819.3
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ CAPITAL SUBSIDY	102	342.2	17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NET CASH FLOW	70	0.0	0.0	340.1	733.2	1165.6	1641.3	2164.5	2740.1	3373.2	4069.7	4835.8	5678.4
ACCUMULATIVE TOTAL	71	-.0	-.0	340.1	1073.2	2238.8	3880.1	6044.7	8784.8	12158.0	16227.7	21063.4	26741.9
NCF DISCOUNTED AT 13%	4	0.0	0.0	54.4	103.7	146.0	181.9	212.3	237.8	259.1	276.6	290.8	302.2
NCF DISCOUNTED AT 15%	5	0.0	0.0	41.8	78.4	108.3	132.6	152.1	167.4	179.2	188.0	194.3	198.4
NCF DISCOUNTED AT 17%	6	0.0	0.0	32.3	59.5	80.8	97.2	109.6	118.6	124.8	128.7	130.7	131.2
OTHER FINANCIAL ARRANGEMENTS														
EQUITY RECOVERED (REQUIRED)	70	0.0	0.0	340.1	733.2	1165.6	1641.3	2164.5	2740.1	3373.2	4069.7	4835.8	5678.4
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	342.2	17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISCOUNTED AT 15%	104	55.6	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPTIONAL LOAN D/D AND REPAY CALC														
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-OPTIONAL LOAN REPAYMENT	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CASHFLOW SUMMARY (000'S)

	1	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
REVENUE	35	21769.6	23946.6	26341.3	28975.4	31872.9	35060.2	38566.2	42422.9	46665.1	51331.7	538659.5
-COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
-COST OF COAL	45	3390.8	3729.9	4102.8	4513.1	4964.4	5460.9	6007.0	6607.7	7268.4	7995.3	83786.9
-COST OF ELECTRICITY	50	1161.5	1277.6	1405.4	1545.9	1700.5	1870.6	2057.6	2263.4	2489.7	2738.7	28741.5
-OPERATING AND MAINTENANCE LABOU	56	5484.5	6033.0	6636.3	7299.9	8029.9	8832.9	9716.2	10687.8	11756.6	12932.2	136634.7
-OPERATING AND MAINTENANCE MATER	57	827.8	910.5	1001.6	1101.8	1211.9	1333.1	1466.4	1613.1	1774.4	1951.8	20537.3
-COST OF TRUCKING	55	708.5	779.4	857.3	943.0	1037.3	1141.1	1255.2	1380.7	1518.8	1670.6	17507.4
TOTAL OPERATING EXPENDITURES	59	11573.1	12730.4	14003.4	15403.8	16944.1	18638.5	20502.6	22552.6	24807.9	27288.7	288059.0
CASH FLOW BEFORE CAPITAL COSTS	60	10196.6	11216.2	12337.8	13571.6	14928.8	16421.7	18063.8	19870.2	21857.2	24043.0	250600.5
ANALYSIS INCLUDING CONSUMER EQUIPMENT												
-CAPITAL COSTS	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
CASH FLOW BEFORE FINANCING	66	10196.6	11216.2	12337.8	13571.6	14928.8	16421.7	18063.8	19870.2	21857.2	24043.0	232631.2
+ SCHEDULED LOAN DRAWDOWN	67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- SCHEDULED LOAN REPAYMENT	68	887.7	1020.8	1174.0	1350.0	1552.6	1785.4	2053.3	2361.2	2715.4	3122.7	23579.5
- INTEREST EXPENSE	69	2703.5	2570.3	2417.2	2241.1	2038.6	1805.7	1537.9	1229.9	875.7	468.6	84155.3
+ OPTIONAL LOAN D/D	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23579.5
- OPTIONAL LOAN REPAY	128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- OPTIONAL LOAN INTEREST	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7354.7
+ CAPITAL SUBSIDY	107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12216.0
NET CASH FLOW	70	6605.4	7625.1	8746.7	9980.5	11337.6	12830.5	14472.7	16279.1	18266.1	20451.8	153337.2
ACCUMULATIVE TOTAL	71	33347.3	40972.3	49719.0	59699.5	71037.1	83867.6	98340.3	114619.3	132885.4	153337.2	
NCF DISCOUNTED AT 12%	4	311.1	317.8	322.6	325.8	327.5	328.0	327.4	325.9	323.6	320.7	5295.3
NCF DISCOUNTED AT 15%	5	200.7	201.4	200.9	199.3	196.9	193.8	190.1	185.9	181.4	176.6	3367.5
NCF DISCOUNTED AT 17%	6	130.4	128.7	126.1	123.0	119.4	115.5	111.4	107.1	102.7	98.3	2175.8
OTHER FINANCIAL ARRANGEMENTS												
EQUITY RECOVERED (REQUIRED)	70	6605.4	7625.1	8746.7	9980.5	11337.6	12830.5	14472.7	16279.1	18266.1	20451.8	153337.2
DCF RATE OF RETURN (%)	103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL SUBSIDY	102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12216.0
DISCOUNTED AT 15%	104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4282.0
OPTIONAL LOAN D/D AND REPAY CALC												
OPENING BALANCE	126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60479.0
+OPTIONAL LOAN DRAWDOWN	127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23579.5
-OPTIONAL LOAN REPAYMENT	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLOSING BALANCE	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64058.5
INTEREST CHARGES	129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7354.7

ASSUMPTIONS ABOUT INFLATION

		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
LABOUR													
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	14	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
TRUCKING													
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	18	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
ELECTRICITY													
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	20	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
OIL													
RATE (PERCENT)	21	15.000	15.000	15.000	15.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	22	1.150	1.323	1.521	1.749	1.924	2.116	2.328	2.561	2.817	3.098	3.408	3.749
COAL													
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	24	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
CAPITAL COSTS													
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	26	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	28	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138

WRIGHT ENGINEERS LIMITED
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VANCOUVER B C V6G 2Z4

REVENUE AND COST CALCULATIONS

		1	1992	1993	1994	1985	1986	1987	1988	1989	1990	1991	1992	1993
PROJECT REVENUE														
TOTAL HEAT CONSUMED		31	86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY CONVERSION EFFICIENCY		32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)		33	86.9	168.4	211.6	235.2	252.1	254.5	259.0	263.5	267.9	267.9	267.9	267.9
ENERGY SELLING PRICE ($/GJ)		34	8.250	9.075	9.982	10.981	12.079	13.287	14.615	16.077	17.685	19.453	21.398	23.538
TOTAL REVENUE		35	716.9	1528.2	2112.3	2582.7	3045.1	3381.5	3785.4	4236.3	4737.7	5211.5	5732.6	6305.9
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)		36	95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONVERSION EFFICIENCY		37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)		38	115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL PURCHASE PRICE ($/GJ)		39	7.347	8.449	9.717	11.174	12.292	13.521	14.873	16.360	17.996	19.796	21.776	23.953
COST OF OIL		40	851.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL														
ENERGY PRODUCED (GJ)		41	0.0	183.4	230.7	256.2	274.2	276.9	281.9	286.9	291.8	291.8	291.8	291.8
CONVERSION EFFICIENCY		42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)		43	0.0	229.3	288.4	320.3	342.8	346.1	352.4	358.6	364.8	364.8	364.8	364.8
COAL PURCHASE PRICE ($/GJ)		44	.944	1.038	1.142	1.256	1.382	1.520	1.672	1.839	2.023	2.225	2.448	2.693
COST OF COAL		45	0.0	238.0	329.3	402.3	473.6	526.1	589.2	659.6	737.9	811.7	892.9	982.2
ELECTRICITY														
COST OF ELECTRICITY		50	27.2	75.3	82.8	157.0	172.6	189.9	208.9	229.8	252.8	278.0	305.9	336.4
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS		51	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
ROUND TRIP DISTANCE (KM)		52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS		53	0.00	15.56	19.59	21.74	23.27	23.50	23.93	24.35	24.77	24.77	24.77	24.77
TRUCKING PRICE ($/TONNE KM)		54	2.904	3.194	3.514	3.865	4.252	4.677	5.145	5.659	6.225	6.847	7.532	8.285
COST OF TRUCKING		55	0.0	49.7	68.8	84.0	98.9	109.9	123.1	137.8	154.2	169.6	186.6	205.2
PROJECT CAPITAL COSTS														
POWER PLANT		61	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DISTRIBUTION SYSTEM AND INITAIL		62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER EQUIPME		63	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSUMER EQUIPMENT		64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER EQUIPME		65	7010.3	5918.1	0.0	5040.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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ASSUMPTIONS ABOUT INFLATION

	1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GENERAL													
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTORS	12	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
LABOUR													
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	14	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
MATERIALS													
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	16	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
TRUCKING													
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	18	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
ELECTRICITY													
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	20	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
OIL													
RATE (PERCENT)	21	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	22	4.124	4.536	4.990	5.489	6.038	6.642	7.306	8.037	8.840	9.724	10.697	11.766
COAL													
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	24	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
CAPITAL COSTS													
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	26	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850
REVENUE (ENERGY SELLING PRICE)													
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
CUMULATIVE FACTOR	28	3.452	3.797	4.177	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850

WRIGHT ENGINEERS LIMITED
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REVENUE AND COST CALCULATIONS

		1	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
PROJECT REVENUE														
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	
ENERGY SELLING PRICE ($/GJ)	34	25.892	28.481	31.329	34.462	37.909	41.699	45.869	50.456	55.502	61.052	67.157	73.873	
TOTAL REVENUE	35	6936.5	7630.1	8393.1	9232.4	10155.7	11171.3	12288.4	13517.2	14869.0	16355.8	17991.4	19790.6	
PROJECT OPERATING COSTS														
OIL														
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
OIL PURCHASE PRICE ($/GJ)	39	26.349	28.984	31.882	35.070	38.577	42.435	46.678	51.346	56.481	62.129	68.342	75.176	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
COAL														
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	
COAL PURCHASE PRICE ($/GJ)	44	2.962	3.258	3.584	3.942	4.337	4.770	5.247	5.772	6.349	6.984	7.683	8.451	
COST OF COAL	45	1080.4	1188.4	1307.3	1438.0	1581.8	1740.0	1914.0	2105.4	2315.9	2547.5	2802.3	3082.5	
ELECTRICITY														
COST OF ELECTRICITY	50	370.1	407.1	447.8	492.6	541.8	596.0	655.6	721.2	793.3	872.6	959.9	1055.9	
COST OF TRUCKING														
COAL AND ASH TO BE TRUCKED (TONS	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
TRUCKING PRICE ($/TONNE KM)	54	9.114	10.025	11.028	12.131	13.344	14.678	16.146	17.761	19.537	21.490	23.639	26.003	
COST OF TRUCKING	55	225.8	248.3	273.2	300.5	330.5	363.6	399.9	439.9	483.9	532.3	585.5	644.1	
PROJECT CAPITAL COSTS														
POWER PLANT	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
DISTRIBUTION SYSTEM AND INITAIL	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL EXCLUDING CONSUMER EQUIPME	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CONSUMER EQUIPMENT	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL INCLUDING CONSUMER EQUIPME	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

[illegible]

	1	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
GENERAL												
RATE (PERCENT)	11	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTORS	12	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
LABOUR												
RATE (PERCENT)	13	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	14	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
MATERIALS												
RATE (PERCENT)	15	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	16	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
TRUCKING												
RATE (PERCENT)	17	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	18	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
ELECTRICITY												
RATE (PERCENT)	19	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	20	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
OIL												
RATE (PERCENT)	21	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	22	12.943	14.237	15.661	17.227	18.950	20.845	22.929	25.222	27.745	30.519	
COAL												
RATE (PERCENT)	23	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	24	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
CAPITAL COSTS												
RATE (PERCENT)	25	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	26	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	
REVENUE (ENERGY SELLING PRICE)												
RATE (PERCENT)	27	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	
CUMULATIVE FACTOR	28	10.835	11.918	13.110	14.421	15.863	17.449	19.194	21.114	23.225	25.548	

WRIGHT ENGINEERS LIMITED
1444 ALBERNI STREET
VANCOUVER B.C. V6G 2Z4

[illegible] AND COST CALCULATIONS

	I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	ACCUM
PROJECT REVENUE												
TOTAL HEAT CONSUMED	31	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	9696.6
ENERGY CONVERSION EFFICIENCY	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENERGY SOLD (GJ)	33	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	267.9	5696.6
ENERGY SELLING PRICE ($/GJ)	34	1.250	[illegible]	[illegible]	10[illegible].1[illegible]7	11[illegible].[illegible]73	130.[illegible]71	143.[illegible]59	159.[illegible]53	174.189	191.608	
TOTAL REVENUE	35	21769.6	23944.6	26341.3	2[illegible]97[illegible].4	31872.9	35060.2	38566.2	42422.9	46665.1	51331.7	528659.5
PROJECT OPERATING COSTS												
OIL												
ENERGY PRODUCED (GJ)	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.0
CONVERSION EFFICIENCY	37	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82
ENERGY PURCHASED (GJ)	38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.9
OIL PURCHASE PRICE ($/GJ)	39	82.673	90.943	100.053	110.065	121.071	133.178	146.496	161.146	177.261	194.987	
COST OF OIL	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	851.2
COAL												
ENERGY PRODUCED (GJ)	41	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	291.8	9377.0
CONVERSION EFFICIENCY	42	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80
ENERGY PURCHASED (GJ)	43	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	364.8	11721.3
COAL PURCHASE PRICE ($/GJ)	44	9.296	10.226	11.249	12.373	13.611	14.972	16.469	18.116	19.927	21.920	
COST OF COAL	45	2390.3	3729.9	4102.8	4513.1	4964.4	5460.9	6007.0	6607.7	7268.4	7995.3	93786.9
ELECTRICITY												
COST OF ELECTRICITY	50	1161.5	1277.6	1405.4	1545.9	1700.5	1870.6	2057.6	2263.4	2489.7	2738.7	28741.5
COST OF TRUCKING												
COAL AND ASH TO BE TRUCKED (T[illegible])	51	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
ROUND TRIP DISTANCE (KM)	52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TONNE-KILOMETERS	53	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	795.96
TRUCKING PRICE ($/[illegible] KM)	54	[illegible]	[illegible]	[illegible]	3[illegible].071	[illegible]	[illegible]	[illegible]	5[illegible].740	61.314	67.446	
COST OF TRUCKING	55	[illegible]	775.4	[illegible]	[illegible]	1[illegible]	1141.1	1255.2	1380.7	1518.8	1670.6	17507.4
PROJECT CAPITAL COSTS												
POWER PLANT	61	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17989.3
DISTRIBUTION [illegible] SYSTEM [illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL EXCLUDING CONSUMER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3
CONSUMER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0
TOTAL INCLUDING CONSUMER [illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17969.3